



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

P.O. BOX 521  
HONOLULU, HAWAII 96809

APR 28 1993

REF:WL-LC

KEITH W. AHUE, Chairperson  
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

JOHN P. KEPPELH, II  
DONA L. HANAIFE

AQUACULTURE DEVELOPMENT  
PROGRAM  
AQUATIC RESOURCES  
CONSERVATION AND  
ENVIRONMENTAL AFFAIRS  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

Ms. Jennifer Perry  
c/o Kapoho Community Association  
P.O. Box 553  
Pahoa, Hawaii 96778

Dear Ms. Perry:

Request for Well Abandonment Permits

Thank you for your March 15, 1993 letter requesting copies of well abandonment permits for KS-1, KS-2, KS-7, and the plug and abandonment permit and program for KS-8.

Since the total number of copies requested is 10 (2 pages per document) and the fee per copy page is \$.50, please send us a check for \$5.00, payable to the Department of Land and Natural Resources. Upon receipt of your check, we will promptly fax the copies to you.

Should you have any questions, please contact Mr. Manabu Tagomori of the Division of Water and Land Development at 587-0230.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Keith W. Ahue".  
KEITH W. AHUE

*fax**WL*

# DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

Central Pacific Plaza, 220 South King Street, 14th Floor, Honolulu, Hawaii  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96824 Telephone: (808) 546-2406 Fax: (808) 586-2377

JOHN WAI  
Governor  
MUFU HANNEMA  
Chac  
BARBARA KIM STANTIC  
Deputy Dirac  
RICK EGG  
Deputy Dirac  
TAKESHI YOSHIMAS  
Deputy Dirac

DATE: MAR 15 1993

TO:	YUKIO KITAGAWA	FAX #:	973-6913 ✓ 973-9613
	JOHN LEWIN		586-4444 ✓
	WINONA RUBIN		586-4890
	KEITH AHUE		586-9099
	JACK KEPPELER		587-0390
	HAROLD MASUMOTO		587-2848 ✓
FROM:	DAN ORODENKER	PHONE #:	586-2531 (808)
		FAX #:	586-2377

This transmittal has a total of 3 pages, including this cover page.

If there is any problem with this transmittal, please call 586-2355.

RECEIVED  
MAR 19 4:13  
DEPT. OF BUSINESS & ECONOMIC DEVELOPMENT


**KAPOHO COMMUNITY ASSOCIATION  
P. O. BOX 553  
PAHOA, HI. 96778  
808-965-8699 (fax), 965-7299  
March 15, 1993**

Mr. Jack Keppler, Acting Director  
Department of Land and Natural Resources

via fax 587-0390

May I request a copy of the well abandonment permits for KS-7, KS-8, KS-1 and KS-2 for the Puna Geothermal Venture Project. If possible, please fax them to the above number, along with the bill. Hiram Young of your department already informed me that there are approximately 16 pages at .50 each.

Your immediate attention is greatly appreciated.  
Thank you,

  
Jennifer Perry, Secretary



## DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

JOHN WAIHEE  
Governor  
MUFU HANNEMANN  
Director  
BARBARA KIM STANTON  
Deputy Director  
RICK EGGED  
Deputy Director  
TAKESHI YOSHIKAWA  
Deputy Director

Central Office: Room 220 South King Street, 11th Floor, Honolulu, Hawaii  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804 Telephone: (808) 586-2400 Fax: (808) 586-1377

### AGENDA (Internal) HAMAKUA COAST COMMUNITY MEETING Laupahoehoe High School Cafeteria March 16, 1993 7:00 pm

- 7:00 - 7:05 I. Introduction/Aloha  
Mufu Hannemann
- A. Participant Introduction
  - B. Agenda
  - C. Meeting Objectives
    - 1. Closure of sugar issue
    - 2. Community Input
- II. Status/Discussion
- 7:05 - 7:10 A. Status of Negotiations (Harold Masumoto)
- 1. Housing
  - 2. Slaughterhouse
  - 3. Harvesting of remaining sugar

## Page 2

- 7:10 - 7:30      B.    Status of Sugar Industry (HSM)
1.    Data on costs
  2.    Data on return
  3.    Number of workers required
  4.    Economics of sugar production
  5.    Hamakua's ability to compete
  6.    State subsidization issues

- 7:30 - 7:50      C.    Questions and Answers

III.   Federal Assistance

- 7:50 - 7:55      A.    Senator Inouye's Office

- 7:55 - 8:00      B.    Senator Akaka's Office

- 8:00 - 8:10      BREAK

- 8:10 - 8:50    IV.   Community Forum

- 8:50 - 9:00    V.    State Response

- A.    State and Federal Actions

- B.    State Responses to Community Needs

- 9:00            ADJOURNMENT



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

P.O. BOX 821  
HONOLULU, HAWAII 96809

REF:WL-LC

APR 15 1993

KEITH W. AHUE, Chairperson  
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

JOHN P. KEPPELER, II  
DONA L. HANAIE

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STATE PARKS  
WATER AND LAND DEVELOPMENT

Ms. Jennifer Shishido  
Administrator  
State of Hawaii  
Division of Occupational Safety and Health  
Department of Labor and Industrial Relations  
830 Punchbowl Street  
Honolulu, Hawaii 96813

Dear Ms. Shishido:

Use of Explosives for Plugging and Abandonment  
of Wells KS-8, KS-1 and KS-2

In accordance with the Department of Land and Natural Resource's Administrative Rules, and under a permit granted by our department, Puna Geothermal Venture (PGV) began plug and abandon operations on the KS-8 well on April 13, 1993. The operations will include utilizing explosive perforating charges deep within the well. In the interest of safety and efficiency, PGV plans to conduct the abandonment operations in a continuous, 24-hour per day basis.

It is our understanding that PGV has requested a variance from your Division for use of explosives on a 24-hour basis. This is to inform you that the Department of Land and Natural Resources has no objection to your granting such a variance. PGV will need this variance to include wells KS-1 and KS-2 for subsequent operations.

Very truly yours,

A handwritten signature in black ink, appearing to read "Keith W. Ahue", written over a horizontal line.

KEITH W. AHUE



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

P.O. BOX 621  
HONOLULU, HAWAII 96809

MAR 11 1993

BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

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DONA L. HANAIE

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WATER AND LAND DEVELOPMENT

REF:WI-LC

Mr. Steven Morris  
Vice President  
Puna Geothermal Venture  
745 Fort Street Mall  
Honolulu, Hawaii 96813

Dear Mr. Morris:

**KS-1 Plug and Abandonment Program**

Your proposed KS-1 (Kapoho State No. 1) Plug and Abandonment Program, dated December 29, 1992, submitted by Mr. Thomas Kizis' December 29, 1992 letter, is approved. The Abandonment Permit for KS-1 is attached.

Please notify the Department, in writing, of the proposed start date for abandonment activities.

Should you have any questions on this matter, please contact Mr. Manabu Tagomori of the Division of Water and Land Development in Honolulu at 587-0230.

Very truly yours,

A handwritten signature in black ink that reads "John P. Keppeler II". The signature is written in a cursive style with a large, stylized "J" and "K".

JOHN P. KEPPELER II  
Acting Director

Enc.

c: Mr. Thomas Kizis



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

P.O. BOX 621  
HONOLULU, HAWAII 96809

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GEOHERMAL WELL ABANDONMENT PERMIT

Kapoho State No. 1 (KS-1)  
Kapoho, Puna, Hawaii

TO: Puna Geothermal Venture  
P.O. Box 30  
Pahoa, Hawaii 96778-0030  
(808) 965-6233

Your application, dated December 29, 1992, for a permit to abandon Geothermal Well Kapoho State No. 1, is approved.

Well Designation: Kapoho State No. 1  
Location: TMK 1-04-1:02, Kapoho, Puna, Hawaii (Well Pad A)  
Leased to: Kapoho Land Partnership  
Subleased to: Puna Geothermal Venture  
Operator: AMOR VIII Corporation  
Ground Elevation: 618 ft. +/- Above Mean Sea Level  
Total Measured Depth: 7,290 ft.

Approval is granted in accordance with the Department's Administrative Rules, Chapter 13-183, HAR, and under the following conditions:

- (1) All work shall be performed in accordance with your KS-1 Plug and Abandonment, Revised Program, dated December 29, 1992, submitted with Mr. Thomas Kizis' letter of December 29, 1992, the Department's Administrative Rules (Chapters 13-183 and 13-184, HAR), and all other applicable Federal, State and County laws, ordinances, and regulations;
- (2) The permittee, his successors and assigns shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury and death arising out of any act or omission of the permittee, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit;
- (3) Except for the surface plug, all cement used for the plugging operations shall contain a high temperature resistant admix as set forth in Section 13-183-83 (a), HAR. In addition, good quality, heavy drilling fluid shall be used to fill all portions of the well not plugged with cement;




GEOTHERMAL WELL DRILLING PERMIT

Kapoho State No. 1 (KS-1)

Page 2

- (4) Subsequent to plugging and abandonment operations, the casing shall be cut off at least six feet below ground surface and all concrete cellars and other structures (e.g., fencing) removed;
- (5) The permittee shall obtain the Chairperson's approval prior to any changes to the abandonment program;
- (6) A history of the well and an as-abandoned diagram of the well shall be filed within sixty days of the abandonment;
- (7) The permittee shall notify the Department, in writing, of the date of the start of work;
- (8) The bond covering the well shall remain in full force and effect until the well is properly abandoned and the site properly restored; and
- (9) This permit shall expire 365 days from the date of issuance.

  
JOHN P. KEPPELER II, Acting Director  
Department of Land and Natural Resources

3.10.93

Date of Issuance

c: Land Board Members  
Hawaii County Planning Dept.  
DBEDT  
Dept. of Health  
OEQC, DOH

June 13, 1983

MEMORANDUM FOR THE RECORD

FROM: Ed Sakoda

SUBJECT: Review of Geothermal Regs, Chapter 183,  
Relating to the H<sub>2</sub>S Gas Accident on  
April 12, 1983 at the Kapoho State I  
Geothermal Well

Following are excerpts from Chapter 183 of Title 13,  
Administrative Rules entitled "Rules on Leasing and Drilling of  
Geothermal Resources":

- I. Subchapter 7. Leases: Mining Operations §13-183-54(a),  
"Operations shall be conducted with due regard for the  
safety and health of employees." "The operator...  
shall notify the chairperson of all accidents within  
twenty-four hours and submit a written report within  
thirty days."
- II. Subchapter 10. Drilling: Operation and Maintenance  
§13-183-80(c), "The operator of any well shall notify  
the chairperson of any blowout, break, leak, or spill  
of any well or appurtenant facilities. The notifica-  
tion to the chairperson shall consist of a written  
report submitted within ten days after discovery of  
the incidents.
- III. Subchapter 13. Drilling: Environmental Protection  
Requirements §13-183-87(b), "Adverse environmental  
impacts from geothermal-related activities shall  
be prevented or mitigated through enforcement of  
these rules and of all other applicable federal,  
state, and local standards, and the application of  
existing technology. Inability to meet these environ-  
mental standards or continued violation of environmental  
standards by any well operator after due notification,  
may be construed as grounds for the chairperson to  
order a suspension of well operations."

Comments.

There does not seem to have been any specific violation of  
DLNR Geothermal Regulations which contributed to the accident.  
However, Hawaii Occupational Safety and Health Standards were  
violated resulting in a citation and penalty. The State Depart-  
ment of Labor and Industrial Relations, Division of Occupational  
Safety and Health, has required the violations to be corrected  
by May 11, 1983.



ED SAKODA

ES:ko

June 13, 1983

MEMORANDUM

TO: Mr. Susumu Ono  
FROM: Robert T. Chuck  
SUBJECT: Report on Accident at Kapoho State 1  
Geothermal Well

We reviewed the actions taken by Thermal Power Company on the accident of April 12, 1983 at Kapoho State 1 geothermal well and find that the procedures followed and taken by the operator were in order and in accordance with DLNR Administrative rules on the leasing and drilling of geothermal resources.

Summarized below are the chronological events that occurred and the corresponding regulatory requirements:

April 12, 1983	Accident occurred. Four crewmen of drilling subcontractor, Water Resources International (WRI), were overcome by H <sub>2</sub> S inhalation.
April 13, 1983	Thermal Power Company notified DOWALD by telephone of accident.  (Section 13-183-54(a), "The operator... shall notify the chairperson of all accidents within twenty-four hours...")
May 12, 1983	Thermal Power Company submitted a written report of the accident signed by Mr. W.L. D'Olier, Vice President.  (Section 13-183-54(a) "The operator... shall...submit a written report within thirty days.")
May 25, 1983	Thermal Power Company, at the request of DOWALD, re-submitted a final report of the accident which included the

Memo to Mr. Susumu Ono

-2-

June 13, 1983

State OSHA report citing WRI with a \$135.00 penalty for not using required protective equipment that was available on the jobsite.

DOWALD's review indicates that the provisions of the Department's Rules have been met by Thermal Power Company and that the follow-up training sessions conducted for 31 persons on the job site by Thermal Power Company are adequate for job safety for future operations.

ROBERT T. CHUCK

MT:ko

cc: J. J. Deter

5-28/13

Bob

Jimmy

} Let's discuss  
check for any  
violations of DLR  
rules/losses.

need to determine  
if we need more stringent  
controls.

118

5/31

med

May 23, 1983

Mr. W. L. D'Olier  
Vice President  
Thermal Power Company  
601 California Street  
San Francisco, California 94108

Dear Mr. D'Olier:

Thank you for your letter of May 12, 1983, informing us of an incident involving the crew of Water Resources International, your drilling contractor on Kapoho State 1 Geothermal Well.

As you know, our staff was notified by telephone of the incident soon after it occurred in April by Mr. Jere Denton of Thermal Power Company. At that time, we requested that a full report be submitted to DLNR by Thermal Power Company and the report should include any occupational and safety hazard investigations, a report by Water Resources International, and Thermal Power Company's report of the overall incident, including any followup action taken or to be taken by all parties. To date, we are still awaiting the submittal of that report.

In our recent telephone conversation with Mr. Denton, he indicated that the report to DLNR will be forthcoming sometime after May 23rd, as he expected to receive the State Labor Department's investigative report and a followup report from Water Resources International sometime during the week of May 16th.

We appreciate your efforts and cooperation in keeping us abreast of your activities in the search for geothermal resources in accordance with the provisions of the State Geothermal Resource Mining Lease and the associated drilling permits.

Very truly yours,

/s/ SUSUMU ONO

SUSUMU ONO  
Chairman of the Board



# **THERMAL POWER**

COMPANY

12 May 1983

WATER &  
POWER

STATE OF HAWAII  
WATER RESOURCES

Mr. Susumu Ono, Chairman  
Board of Land and Natural Resources  
Kalanimoku Bldg. Rm. 130  
1151 Punchbowl St.  
Honolulu, Hawaii 96813

Re: Geothermal Well: Kapoho State 1  
Geothermal Resource Mining Lease  
No. R-2  
Puna District, Hawaii

Dear Mr. Ono:

On April 12th at the Kapoho State 1 well site, four of our drilling contractor's crewman were affected by an accidental release of gas containing  $H_2S$ . One crewman was affected while working within the geothermal wellhead cellar. The other three crewmen were affected while assisting the first out of the cellar. Fortunately, the incident did not result in any serious injuries or lasting effects to the crewmen.

Puna Geothermal Venture is vitally concerned about safety for all workers on our well sites. Although roughly 170 accident-free days of drill rig operation on our Kapoho State wells by Water Resources International, Inc. (WRI) preceded this event, some immediate measures have been taken by Thermal Power Company, Operator, to further reduce the possibility of accidental  $H_2S$  exposure.

1. Previous instructions for WRI crews not to enter the geothermal wellhead cellars without task specific instructions have been repeated to WRI crews, supervisors and management. We are providing copies of Safety Orders for Drilling and Production of the California Division of Industrial Safety to WRI for our joint use in making all persons aware of safe work practices.
2. Environmental Safety Service and Equipment International, Inc., of Houston, a firm specializing in  $H_2S$  safety programs, was brought out by Thermal Power Company on April 19-21 to provide safety training to each member of the three drill rig crews and others, (approximately 31 people). The Kapoho State 1 operations concluded, without further incidents, on April 28th when the contractors drill rig and crews were released.

Mr. Susumu Ono  
Page Two  
12 May 1983

3. Scott personal respiratory equipment was on site during the event. Additional new and lighter Emergency Life Support Apparatus, (ELSA) face masks will be provided along with individual instructions. These will be placed in locations immediate to the geothermal wellhead cellar when we again utilize a drill rig.

A news release is being made by Thermal Power Company now that the Occupational Safety and Health Administration's report has been released. Thermal Power Company will continue to pursue active safety programs both directly and through our contractors. We would be happy to include representatives from your agency in future safety training programs. If you have any questions please call me at (415) 765-0449.

Sincerely yours

  
W. L. D'Olier  
Vice President

WLD/ikl

cc: County Civil Defense Director  
County Planning Department  
Department of Health  
Dept. of Planning & Econ. Dev.  
Amfac Energy, Inc.  
Dillingham Geothermal, Inc.  
Water Resources International, Inc.



DIVISION OF WATER AND LAND DEVELOPMENT

From: \_\_\_\_\_ Date: \_\_\_\_\_ File In: \_\_\_\_\_

To Initial

\_\_\_\_\_ Robert T. Chuck

\_\_\_\_\_ See Me

\_\_\_\_\_ Takeo Fujii

\_\_\_\_\_ Take action by \_\_\_\_\_

\_\_\_\_\_ James Yoshimoto

\_\_\_\_\_ Route to your branch

✓ \_\_\_\_\_ Manabu Tagomori

\_\_\_\_\_ Review & comment

\_\_\_\_\_ George Morimoto

\_\_\_\_\_ Draft reply by \_\_\_\_\_

\_\_\_\_\_ Herbert Morimatsu

\_\_\_\_\_ For information

\_\_\_\_\_ George Miyashiro

\_\_\_\_\_ Xerox distributed

\_\_\_\_\_ Harold Sakai

\_\_\_\_\_ Acknowledge receipt

\_\_\_\_\_ Leslie Asari

\_\_\_\_\_ File

\_\_\_\_\_ Albert Ching

\_\_\_\_\_ Jane Sakai

\_\_\_\_\_ George Matsumoto

\_\_\_\_\_ Doris Hamada

\_\_\_\_\_ Daniel Lum

\_\_\_\_\_ Lorraine Nanbu

\_\_\_\_\_ Paul Matsuo

\_\_\_\_\_ Jean Starot

\_\_\_\_\_ Noboru Kaneshiro

\_\_\_\_\_ Elsie Yonamine

\_\_\_\_\_ Edwin Sakoda

\_\_\_\_\_ Kay Oshiro

✓ State OSHA find WRI

✓ WRI to report to PDU.

- PDU (Thru PDU) to report to DWR

(Expected date of report  
wk of May 23-24)

*Dowald*

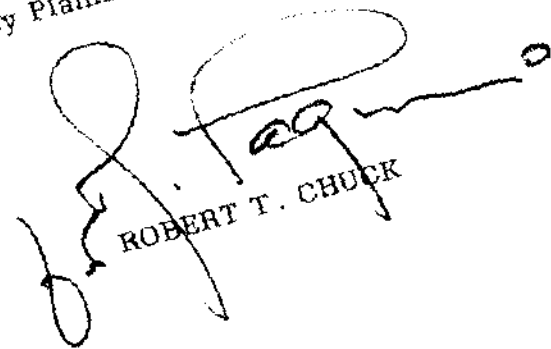
5/13/83

SUS:

This incident involved Water Resources International (WRI), the drilling contractor for Thermal Power Co. on the Kapoho State geothermal wells. The crew of WRI apparently did not follow standard safety rules established by Thermal Power Co. As a result in the latest action, OSHA fined WRI \$150.00 for not following the established safety rules.

DOWALD was immediately notified of the incident by Thermal Power Co. and we were awaiting a report from them. Thermal Power in turn was waiting for a detailed report from WRI. Now that OSHA has concluded its investigations and has taken appropriate action, both WRI and Thermal Power will be finalizing their reports. We expect to get a detailed report soon.

We notified both DOH and the County Planning Department of the incident when it happened in April.

  
ROBERT T. CHUCK

Know about this  
incident? DoH kept  
us informed? etc.  
and



DEPARTMENT OF LAND  
AND NATURAL RESOURCES

NOTICE OF MESSAGE RECEIVED  
\*\*\*\*\*

DATE 5/12 TIME 2:16 A.M.  
P.M.

FOR S.O.

FROM Nickie Norman  
(MR.) (MRS.) (MISS) (MS.)

OF Th...

PHON Would like to report

☐  
☐  
☐  
☐

to us on a press  
release coming  
out today is open  
before we read  
it in the paper. I  
was in the  
board room - asked  
that Bob Chua call.  
However, Bob Chua  
and both? not. Should  
you call? -- vrcj.

N  
CU  
AT ONCE

TAKEN BY:

March 18, 1983

TO: Mrs. Jacqueline Parnell, Interim Director  
Office of Environmental Quality Control

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension - Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is September 14, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

SUSUMU ONO  
Chairman of the Board

Attach.

March 18, 1983

TO: Mr. Sidney H. Fuks, Director  
Planning Department  
County of Hawaii

FROM: Eugene Cho

SUBJECT: Geothermal Drilling Permit Extension - Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 189-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is September 14, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

EUGENE CHO  
Chairman of the Board

Attach.

March 18, 1983

TO: Honorable Hideto Kono, Director  
Department of Planning & Economic Development

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension - Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is September 14, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

SUSUMU ONO  
Chairman of the Board

Attach.

March 18, 1983

TO: Honorable Charles Clark, Director  
Department of Health

FROM: Susumu ORO

SUBJECT: Geothermal Drilling Permit Extension - Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is September 14, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

SUSUMU ORO  
Chairman of the Board

Attach.



March 18, 1983

TO: Division Heads

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension - Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is September 14, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

SUSUMU ONO

SUSUMU ONO  
Chairman of the Board

Attach.

March 18, 1983

TO: Mr. Moses W. Keoloha, Member  
Board of Land and Natural Resources

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension - Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is September 14, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

SUSUMU ONO  
Chairman of the Board

Attach.

Similar letter sent to:

Mr. Roland H. Higashi  
Mr. Thomas S. Yagi  
Mr. J. Douglas Ing  
Mr. Takeo Yamamoto

March 12, 1983

- o Pollution of the ocean and tidelands, rivers, or other bodies of water, and all impairment of and interference with bathing, fishing, or navigation in the waters of the ocean or any bay or inlet thereof is prohibited, and no brine, minerals, or any refuse of any kind from any well or works shall be permitted to be deposited on or pass into waters of the ocean, any bay or inlet thereof, rivers, lakes or other bodies of water, without specific written State authorization.
- o No substances which may be produced from any well drilled upon the lands shall be blown, flowed, or allowed to escape into the open air or on the ground in such a manner as to create a nuisance, which shall specifically include but not be limited to noise, air or other pollution, and other activities which disturb the occupier's or his tenant's use of the lands. Subject to the foregoing, the applicant may bleed substances to the atmosphere so long as such operations are lawfully and prudently conducted in accordance with good geothermal drilling and production practices and are not otherwise in violation of the law.

Very truly yours,

*[Signature]*

SUSUMU ONO  
Chairman of the Board

September 23, 1982

Mr. Sidney M. Fuke  
Director  
Planning Department  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

Dear Mr. Fuke:

Geothermal Drilling Permit Extension-  
Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is March 18, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

Very truly yours,

SUSUMU ONO  
Chairman of the Board

Enc.

September 23, 1982

Mrs. Jacqueline Parnell  
Interim Director  
Office of Environmental  
Quality Control  
550 Halekauwila Street  
Room 301  
Honolulu, Hawaii 96813

Dear Mrs. Parnell:

Geothermal Drilling Permit Extension-  
Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 130-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is March 18, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

Very truly yours,

/s/ SUSUMU ONO

SUSUMU ONO  
Chairman of the Board

Enc.

September 23, 1982

Mr. Hideto Kono, Director  
Department of Planning & Economic  
Development  
State of Hawaii  
Kamamalu Bldg.  
250 S. King Street  
Honolulu, Hawaii 96813

Dear Mr. Kono:

Geothermal Drilling Permit Extension-  
Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is March 18, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

Very truly yours,

/s/ SUSUMU ONO

SUSUMU ONO  
Chairman of the Board

Enc.

September 23, 1982

Mr. Charles Clark  
Director of Health  
Department of Health  
P.O. Box 3378  
Honolulu, Hawaii 96801

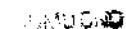
Dear Mr. Clark:

Geothermal Drilling Permit Extension-  
Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is March 18, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

Very truly yours,



SUSUMU ONO  
Chairman of the Board

Enc.

September 23, 1982

MEMORANDUM

TO: Board Members

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension -  
Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is March 18, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

/S/SUSUMU ONO/

SUSUMU ONO  
Chairman of the Board

Enc.



September 23, 1982

MEMORANDUM

TO: Division Heads

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension -  
Kapoho State No. 1

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1. The new expiration date is March 18, 1983. The extension allows further testing of the well to better understand the geothermal reservoir, the operating characteristics of the well, and other necessary data.

A copy of the permit is attached.

/s/ SUSUMU ONO

SUSUMU ONO  
Chairman of the Board

Enc.



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
P. O. BOX 621  
HONOLULU, HAWAII 96809

SUSUMU ONO, CHAIRMAN  
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU  
DEPUTY TO THE CHAIRMAN

DIVISIONS:  
AQUACULTURE DEVELOPMENT  
PROGRAM  
AQUATIC RESOURCES  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

September 20, 1982

Mr. Jere Denton  
Vice President  
Hawaii Project  
Thermal Power Company  
1600 Kapiolani Blvd., Suite 808  
Honolulu, Hawaii 96814

Dear Mr. Denton:

Geothermal Drilling Permit - Kapoho State No. 1

The Department of Land and Natural Resources approves your request for a 180-day extension of the drilling permit for Kapoho State No. 1. The new expiration date is March 18, 1983.


Please be informed that all provisions of the original permit are applicable through this extension period and that reasonable prior notice should be given our staff whenever any testing is to be conducted. Appropriate lead time is necessary for scheduling staff personnel to inspect the test activities.

Additionally, the following conditions are applicable to this permit:

- The applicant shall comply with all valid requirements of all municipal, state and federal authorities and observe all municipal, state and federal laws and regulations pertaining to the lands and permittee's operations, which are now in force or which may hereafter be in force, including, but not limited to, all water and air pollution control laws, and those relating to the environment. The State of Hawaii, acting in its governmental capacity, may by regulation regulate the drilling, location, spacing, testing, completion, production, operation, maintenance and abandonment of a well or wells or similar activity as well as the construction, operation and maintenance of any other facilities in the exercise of its police powers to protect the public health, welfare and safety as provided in the regulations.

- Pollution of the ocean and tidelands, rivers, or other bodies of water, and all impairment of and interference with bathing, fishing, or navigation in the waters of the ocean or any bay or inlet thereof is prohibited, and no brine, minerals, or any refuse of any kind from any well or works shall be permitted to be deposited on or pass into waters of the ocean, any bay or inlet thereof, rivers, lakes or other bodies of water, without specific written State authorization.
- No substances which may be produced from any well drilled upon the lands shall be blown, flowed, or allowed to escape into the open air or on the ground in such a manner as to create a nuisance, which shall specifically include but not be limited to noise, air or other pollution, and other activities which disturb the occupier's or his Tenant's use of the lands. Subject to the foregoing, the applicant may bleed substances to the atmosphere so long as such operations are lawfully and prudently conducted in accordance with good geothermal drilling and production practices and are not otherwise in violation of the law.

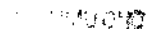
Very truly yours,

  
SUSUMU ONO  
Chairman of the Board



- o Pollution of the ocean and tidelands, rivers, or other bodies of water, and all impairment of and interference with bathing, fishing, or navigation in the waters of the ocean or any bay or inlet thereof is prohibited, and no brine, minerals, or any refuse of any kind from any well or works shall be permitted to be deposited on or pass into waters of the ocean, any bay or inlet thereof, rivers, lakes or other bodies of water, without specific written State authorization.
- o No substances which may be produced from any well drilled upon the lands shall be blown, flowed, or allowed to escape into the open air or on the ground in such a manner as to create a nuisance, which shall specifically include but not be limited to noise, air or other pollution, and other activities which disturb the occupier's or his Tenant's use of the lands. Subject to the foregoing, the applicant may bleed substances to the atmosphere so long as such operations are lawfully and prudently conducted in accordance with good geothermal drilling and production practices and are not otherwise in violation of the law.

Very truly yours,



SUSUMU ONO  
Chairman of the Board

*Handwritten:* 10/11

RECEIVED



**THERMAL POWER**  
COMPANY

15 September 1982

DEPT. OF LAND  
& NATURAL RESOURCES  
STATE OF HAWAII  
Jere Denton  
Vice President  
Hawaii Project

DIV. OF WATER &  
LAND DEVELOPMENT

82 SEP 16 P 3: 49

RECEIVED

Mr. Susumu Ono  
Chairman  
Board of Land & Natural Resources  
State of Hawaii  
Kalanimoku Building  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Attention: Mr. Manabu Tagomori

Dear Mr. Ono:

Thermal Power Company would like to request a second 180 day extension to the drilling permit for the Kapoho State #1 geothermal well located on State Geothermal Mining Lease R-2 near Puu Honuaua in the Puna district of the island of Hawaii. This extension will allow further testing of the well to assist in better understanding the geothermal reservoir, the operating characteristics of the well, the nature of the geothermal fluids being produced, and to gather information necessary for preliminary design of a geothermal electric power plant. As the current drilling permit for this well expires on September 19th, I hope this renewal can be made effective fairly quickly. If there are any questions which I can answer which would assist in your consideration of the renewal of this permit, please call me at 944-5545.

Sincerely yours,

JMD/crn

cc: W. L. D'Olier

April 13, 1982

Thermal Power Company  
501 California Street  
San Francisco, California 94108

Attention: Mr. William D'Olier

Gentlemen:

Your supplementary application dated March 29, 1982, for permission to make changes to your original casing program for the geothermal well described below, is hereby approved:

Well Designation: Kapoho State 1  
Location: T-1-4-01:2, Kapoho, Puna, Hawaii  
Lease: DADR Lease A-2  
Lessee: Kapoho Land Partnership  
Sub-lessee: Thermal Power Co.  
Ground Elevation: 800+

You are hereby granted permission to make the changes outlined in your supplementary application on the Kapoho State 1 geothermal well, in accordance with the Department's rules, Chapter 183 of Title 13, and the following conditions:

- (1) All work shall be performed in accordance with the Well Program submitted with your application.
- (2) Within 30 days of the completion of the contemplated work, an "as-built" drawing and a brief log of the well program actually performed, shall be submitted to our Department.

Very truly yours,

/s/SUSUMU ONO

SUSUMU ONO  
Chairman of the Board

cc: Mr. Jere Denton

*Brundish*



**THERMAL POWER**

COMPANY

1709

March 29 1982 P 3:41

ENR  
March

29 March 1982

STATE OF HAWAII

Mr. Susumu Ono, Chairman  
Board of Land and Natural Resources  
State of Hawaii  
Kalanimoku Building  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Re: Geothermal Well: Kapoho State 1  
Geothermal Resource Mining Lease R-2  
Puna District, Hawaii County

Dear Mr. Chairman:

A DLNR Permit, recently renewed, exists for the drilling and completion of the referenced well. Since the conclusion of drilling in November 1981, Kapoho State 1, except for an attempted flow test on December 16, 1981, has been maintained in a shut-in status awaiting a coordinated flow testing program with our second well, which soon will be completed.

Thermal has monitored Kapoho State 1 in its shut-in status and evaluated the sparse results of the December 16th effort. Because wellhead pressures have been higher than anticipated, we would recomplete the wellhead with 900 series WKM gates which have a higher pressure rating than the 600 series WKM gates now on the wellhead. Additionally, we wish to evaluate the 9-5/8" production casing string for integrity or any possible leakage. If any leakage is demonstrated, we would, in accordance with the attached well program, repair such with cement and possibly a 7" casing sleeve inside the 9-5/8" casing.

Thermal proposes these actions at Kapoho State 1 to increase the safety margins in flow testing this high pressured well. We would proceed with the well program attached promptly upon completion of work at Kapoho State 2. We respectfully request your earliest possible approval, for in the case of leakage, we have noted the regulations at 13-183-76(c) regarding diligent repair and at 13-183-87(4)(j) regarding ground water protection.

Very truly yours,

W. L. D'Olier

Vice President, Exploration

WLD/ikl

cc: J. M. Denton  
HA-PU-BR-A01



**Geothermal Well: Kapoho State 1**

Location: TMK 1-4-01:2  
Kapoho, Puna, Hawaii County  
Elevation: 618.77' GL or 636.77' KB  
Total Depth: 7290'

**Casing Depths:**

20" to 71'  
13-3/8" to 903'  
9-5/8" to 4072'  
7" from 3897 to 7216'

**Status:** Shut in with 600 psig wellhead pressure.

**WELL PROGRAM: CASING EVALUATION AND COMPLETION IMPROVEMENTS.**

1. Move in and rig up rotary drilling rig.
2. Remove upper master valve. Install BOE stack, consisting of spool, double hydraulic gate (with pipe rams and blank rams), Hydril and Grant rotating head.
3. Hook up rig pumps to side outlets on wellhead and spool with blind rams closed, pump water into well at maximum rate and kill well. Strip in open ended 4" drill pipe if well is not killed. Run to bottom, pump in water and kill well. Utilize a brine solution if required.
4. With well killed, run in hole with 6" bit and 6 drill collars. Clean out inside 7" liner to bottom at 7216'.
5. Run 8-1/2" bit through 9-5/8" casing to top of 7" at 3097'.
6. Set a bridge plug in 9-5/8" casing at 3890'±.
7. Run retrievable RTTS packer and check 9-5/8" casing for any leaks.
8. Squeeze any casing leaks indicated.
9. Retrieve RTTS packer and clean out to top of bridge plug in 9-5/8 casing.
10. Consider running solid 7" N-80, 26 pound, buttress casing through deepest cemented zone or to the top of the 7" liner, and cement back to surface.
11. If 7" is run, cut off 9-5/8" casing a few inches below casing head flange and install new casing expansion spool for 7" casing.
12. Install one Midway shut-in spool and one 10" 900 series WKM master gate on the wellhead.

13. Drill out bridge plug and clean out to bottom of 7" perforated liner with water.
14. Remove BOE stack. Install second 10" 900 Series WKM gate. Put well on test.

WLD/HEW/ROB/ikl

cc: HA-PU-BR-A-01

March 25, 1982

Mr. Jere Denton  
Vice President  
Hawaii Project  
Thermal Power Company  
1600 Kapiolani Blvd., Suite 808  
Honolulu, Hawaii 96814

Dear Mr. Denton:

Geothermal Drilling Permit - Kapoho State No. 1

The Department of Land and Natural Resources approves your request for a 180-day extension of the drilling permit for Kapoho State No. 1. The new expiration date is September 19, 1982.

Please be informed that all provisions of the original permit are applicable through this extension period and that reasonable prior notice should be given our staff whenever any testing is to be conducted. Appropriate lead time is necessary for scheduling staff personnel to inspect the test activities.

If we can be of further assistance, please contact us.

Very truly yours,

JUSUJUS JRG  
Chairman of the Board

# DEPARTMENT OF LAND AND NATURAL RESOURCES

57

## Division of Water and Land Development

Approved by the Board of  
Land & Natural Resources  
at the meeting held on

TO:

FOR:

- ② ✓ Chairman  
 \_\_\_\_\_ Deputy to Chairman  
 \_\_\_\_\_ Board Member  
 \_\_\_\_\_ Deputy Attorney General  
 \_\_\_\_\_ Planning Office  
 \_\_\_\_\_ State Parks  
 \_\_\_\_\_ Fish and Game  
 \_\_\_\_\_ Forestry  
 ① ✓ Land Management *for ASD 3/11/82*

- ② ✓ Signature  
 \_\_\_\_\_ Approval  
 \_\_\_\_\_ Approval as to Form  
 \_\_\_\_\_ Approval & Transmittal to Governor  
 \_\_\_\_\_ Comment  
 \_\_\_\_\_ Recommendation  
 \_\_\_\_\_ Investigation & Report  
 \_\_\_\_\_ Appropriate Action  
 \_\_\_\_\_ Retention  
 \_\_\_\_\_ Return  
 ① ✓ *Info*

REMARKS:

*Extension of  
drilling permit for  
Lapole State No. 1*

*Bob*

Signature

*March 22*, 19 *82*

Route Slip  
WATER SOURCES & FLOOD CONTROL B 'CH

From: ER Date: 1/4/82 File in: \_\_\_\_\_

<u>To</u>	<u>Initial</u>	<u>Please</u>
_____	Manabu Tagomori	_____ See me
_____	Albert Ching	_____ Call
_____	Daniel Lum	_____ Take action by _____
_____	George Matsumoto	_____ Review & comment
_____	Nobu Kaneshiro	_____ Draft reply by _____
_____	Tom Nakama	_____ Type draft
_____	Paul Matsuo	_____ Type final
_____	Edwin Sakoda	_____ Xerox _____ copies
_____	Mitchel Ohye	_____ Mail
_____	Milton Yamasaki	<u>For</u> _____ Approval
_____	Joe Menor	_____ Signature
_____	Doris Hamada	✓ Information

_____ Robert Chuck	_____ Jane Sakai	_____ Bill Koyanagi
_____ Takeo Fujii	_____ Elsie Yonamine	_____ Richard Jinnai
_____ James Yoshimoto	_____	_____ Yoshi Shibuya
_____	_____	_____

KAPOHO STATE 1 (2883-02)

LAT: 19° 28' 47"

Long: 154° 53' 39"

December 21, 1981

MEMORANDUM

TO: Mr. James Detor

FROM: Robert Chuck

SUBJECT: Kapoho State Well 1, Geothermal Well Site,  
Kapoho, Puna, Hawaii, Tax Map Key: 1-4-01:2

For your information and files, attached is a copy of the surveyed location and easement to Kapoho State 1 Geothermal well.

ROBERT T. CHUCK

DL:ko

DONALD JAMES MURRAY  
P. O. Box 863  
Residence: 935-9189

*Murray, Smith & Associates, Ltd.*

Hilo Hotel Office Annex  
Hilo, Hawaii 96720  
Telephone (808) 935-9725

July 10, 1981

Richard J. Miller, Landman  
Thermal Power Company  
601 California Street  
San Francisco, California 94108

RECEIVED  
JUL 13 1981

TPC

Re: "Kapoho State 1"  
Geothermal Well Site  
Kapoho, Puna, Hawaii  
Tax Map Key: 1-4-01:2

Dear Sir:

Submitted herewith please find the following:

1. Four (4) maps denoting Easements covering the "Kapoho State 1" Well Site (75,000 Square Feet or 1.7218 Acres) and "Road & Utility Easement" 30-Foot Wide (47,896 Square Feet or 1.0993 Acres).
2. Originals of legal descriptions covering "Kapoho State 1" Well Site and the Road & Utility Easement.

Please be informed that the "Kapoho State 1" Well Site has been surveyed and staked on the ground.

Also, we are presently preparing a Topographic and Contour Plan of the "Kapoho State 1" Well Site and will submit same shortly. This plan may need Stamping by a Registered Civil Engineer and approval by appropriate County Departments.

Please review enclosures and advise.

Very truly yours,

MURRAY, SMITH & ASSOCIATES, LTD.

*Donald James Murray*

Donald James Murray

encls.

cc. Jere Denton, Vice President  
Hawaii Operations

DJM:hm

EXHIBIT "A"

ROAD AND UTILITY EASEMENT I

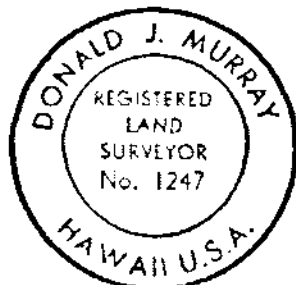
to

"KAPOHO STATE 1"

Geothermal Well Site  
Within L.P. 8177 and R.P. 4497  
L.C. Aw. 8559 Apana 5 to C. Kanaina  
Kapoho, Puna, Hawaii

Beginning at a point at the northwest corner of this parcel of land and on the easterly side of the Pohoiki Road, the coordinates of said point of beginning referred to Government Survey Triangulation Station "Kaliu" being 8,223.20 feet North and 8,563.44 feet East and running by azimuths measured clockwise from true South:

- |     |              |   |
|-----|--------------|---|
| 1.  | 284° 01'     | 146.45 feet;  |
| 2.  | 249° 13'     | 85.26 feet;   |
| 3.  | 243° 34'     | 101.26 feet;  |
| 4.  | 242° 05'     | 163.01 feet;  |
| 5.  | 247° 24'     | 440.08 feet;  |
| 6.  | 242° 42'     | 248.58 feet;  |
| 7.  | 237° 18'     | 77.82 feet;   |
| 8.  | 228° 12'     | 117.13 feet;  |
| 9.  | 332° 58' 20" | 31.02 feet along "Kapoho State 1" Easement to a pipe;   |
| 10. | 48° 12'      | 111.60 feet;  |
| 11. | 57° 18'      | 81.63 feet;   |
| 12. | 62° 42'      | 251.22 feet;  |
| 13. | 67° 24'      | 439.92 feet;  |
| 14. | 62° 05'      | 162.01 feet;  |
| 15. | 63° 34'      | 103.12 feet;  |
| 16. | 69° 13'      | 86.74 feet;   |
| 17. | 57° 22' 20"  | 157.28 feet to a point at the easterly side of the Pohoiki Road; thence along the easterly side of Pohoiki Road along a curve to the left having a radius of 182.00 feet, the chord azimuth and distance being: |
| 18. | 172° 12' 58" | 149.70 feet to the point of beginning and containing an area of 47,896 Square Feet or 1.0995 Acres.   |



MURRAY, SMITH & ASSOCIATES, LTD.

By

Donald James Murray  
Donald James Murray

Hilo, Hawaii  
July 9, 1981

EXHIBIT "A"  
(continued)



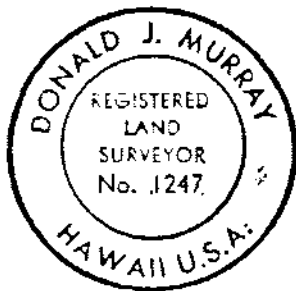
EASEMENT

"KAPOHO STATE 1"

Geothermal Well Site  
Within L.P. 8177 and R.P. 4497  
L.C. Av. 8559 Apana 5 to C. Kanaina  
Kapoho, Puna, Hawaii

Beginning at a point at a pipe at the west corner of this parcel of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "Kaliu" being 8,982.83 feet North and 9,677.70 feet East and running by azimuths measured clockwise from true South:

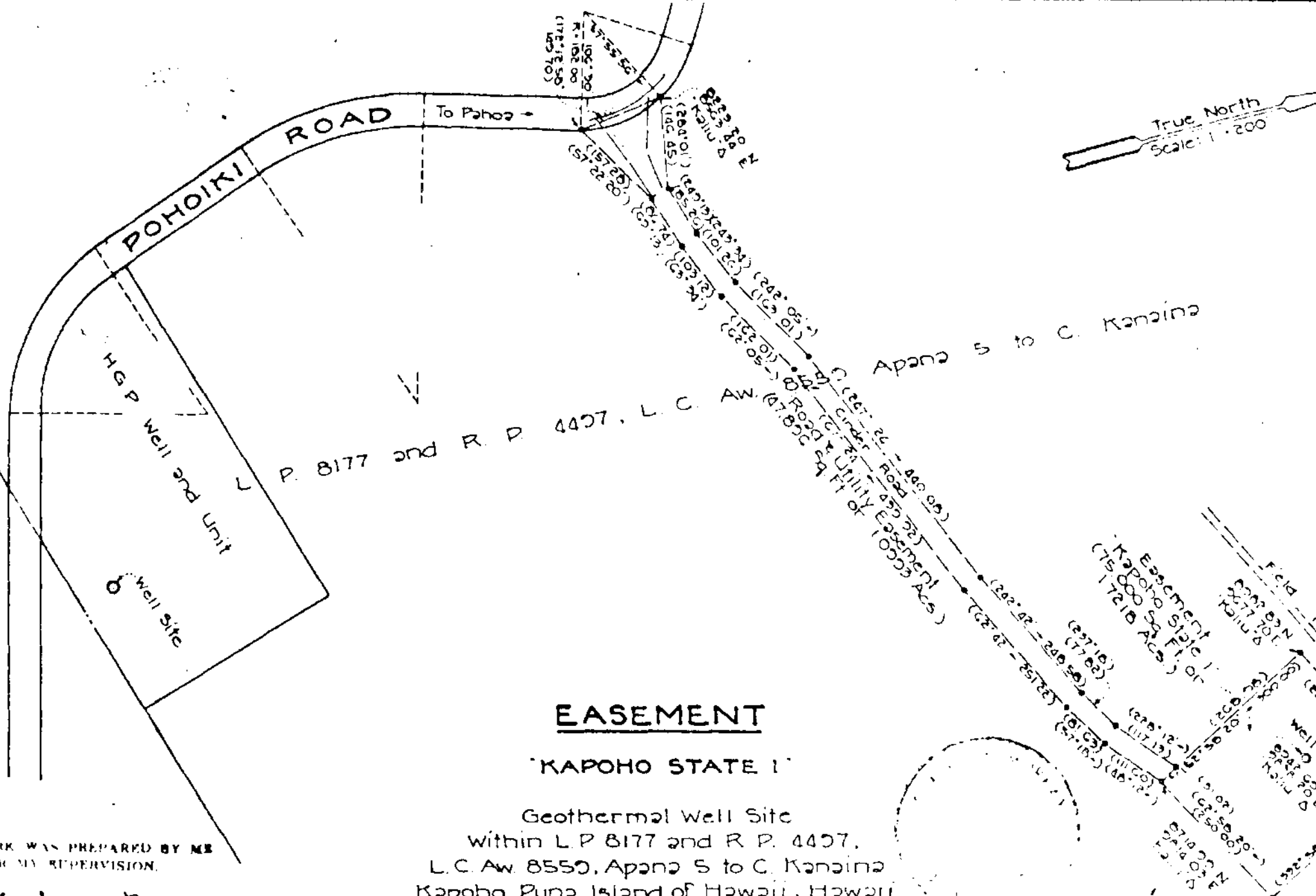
- |                 |  |
|-----------------|--|
| 1. 242° 58' 20" | 250.00 feet to a pipe;   |
| 2. 332° 58' 20" | 300.00 feet to a pipe;   |
| 3. 62° 58' 20"  | 250.00 feet to a pipe;   |
| 4. 152° 58' 20" | 300.00 feet to the point of beginning<br>and containing an area of<br>75,000 Square Feet or 1.7218<br>Acres. |



MURRAY, SMITH & ASSOCIATES, LTD.

By Donald James Murray  
Donald James Murray  
Registered Surveyor

Hilo, Hawaii  
July 9, 1981



True North  
Scale: 1" = 200'

# **EASEMENT**

**"KAPOHO STATE I"**

Geothermal Well Site  
within L.P. 8177 and R.P. 4457,  
L.C. Aw. 8550, Apana S to C. Kanaina  
Kapoho, Puna, Island of Hawaii, Hawaii

Survey and Plan by Murray, Smith & Associates, Ltd.  
P.O. Box 863  
Hilo, Hawaii

THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION.

*Donald James Murray*

TMK: 1-4-01-2  
July 10, 1981

**EXHIBIT "B"**


October 1, 1981

MEMORANDUM

TO: Mr. Steve Nishimoto  
FROM: Robert T. Chuck  
SUBJECT: Kapoho State No. 1 Well

Attached for your information and files is a copy of correspondence and data concerning land survey of the Kapoho State No. 1 well site.

ROBERT T. CHUCK



RTC:DL:ko  
Enc.



**THERMAL POWER**  
COMPANY

21  
15

15 September 1981

Mr. Robert Chuck  
Manager and Chairman  
Department of Water Land Development  
Post Office Box 373  
Honolulu, Hawaii 96809

Attention: Mr. Dan Lum

Dear Dan:

Enclosed is the Grade Plan for Kapoho State #1 Geothermal Well Site and the Road and Utility Easement for said well as surveyed by Mr. Donald James Murray. The top of the concrete cellar is 618.77' as shown on the Grade Plan for Kapoho State #1. I would be more than happy to answer any questions that you may have regarding our drilling activity at Kapoho, Hawaii.

Very truly yours,

Lou deLeon  
Geologist

LdL/lam  
Enclosure

cc: J.M. Denton

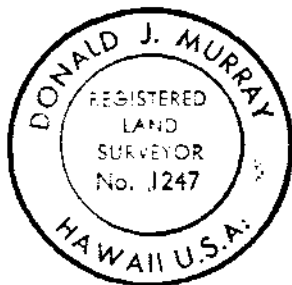
EASEMENT

"KAPOHU STATE 1"

Geothermal Well Site  
Within L.P. 8177 and R.P. 4497  
L.C. Av. 8559 Apana 5 to C. Kanaina  
Kapoho, Puna, Hawaii

Beginning at a point at a pipe at the west corner of this parcel of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "Kaliu" being 8,982.83 feet North and 9,677.70 feet East and running by azimuths measured clockwise from true South:

- |    |              |  |
|----|--------------|--|
| 1. | 242° 58' 20" | 250.00 feet to a pipe;   |
| 2. | 332° 58' 20" | 300.00 feet to a pipe;   |
| 3. | 62° 58' 20"  | 250.00 feet to a pipe;   |
| 4. | 152° 58' 20" | 300.00 feet to the point of beginning<br>and containing an area of<br>75,000 Square Feet or 1.7218<br>Acres. |



MURRAY, SMITH & ASSOCIATES, LTD.

By Donald James Murray  
Donald James Murray  
Registered Surveyor

Hilo, Hawaii  
July 9, 1981



ROAD AND UTILITY EASEMENT

to

"KAPOHO STATE 1"

Geothermal Well Site

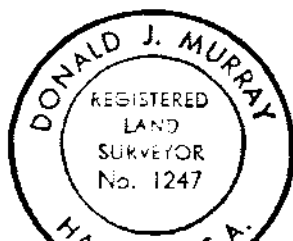
Within L.P. 8177 and R.P. 4497

L.C. Aw. 8559 Apana 5 to C. Kanaina

Kapoho, Puna, Hawaii

Beginning at a point at the northwest corner of this parcel of land and on the easterly side of the Pohoiki Road, the coordinates of said point of beginning referred to Government Survey Triangulation Station "Kaliu" being 8,223.20 feet North and 8,563.44 feet East and running by azimuths measured clockwise from true South:

- |     |              |   |
|-----|--------------|---|
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| 6.  | 242° 42'     | 248.58 feet;  |
| 7.  | 237° 18'     | 77.82 feet;   |
| 8.  | 228° 12'     | 117.13 feet;  |
| 9.  | 332° 58' 20" | 31.02 feet along "Kapoho State 1" Easement to a pipe;   |
| 10. | 48° 12'      | 111.60 feet;  |
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| 18. | 172° 12' 58" | 149.70 feet to the point of beginning and containing an area of 47,896 Square feet or 1.0995 Acres.   |



MURRAY, SMITH & ASSOCIATES, LTD.

By

*Donald James Murray*  
Donald James Murray





September 28, 1981

Mr. Lou DeLeon  
Thermal Power Co.  
601 California Street  
San Francisco, California 94108

Dear Mr. DeLeon:

Attached for your information is a copy of a staff memorandum on the measurement of static water level in the Kapoho State #1 geothermal well.

Very truly yours,

ROBERT T. CHUCK  
Manager-Chief Engineer

RTC:DL:ko  
Attach.  
cc: Mr. Steve Nishimoto

GEORGE R. ARIYOSHI  
GOVERNOR OF HAWAII



**STATE OF HAWAII**  
**DEPARTMENT OF LAND AND NATURAL RESOURCES**  
DIVISION OF LAND MANAGEMENT  
P. O. BOX 621  
HONOLULU, HAWAII 96809

**DIVISIONS:**  
CONVEYANCES  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

GEORGE R. ARIYOSHI  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 521  
HONOLULU, HAWAII 96809

DIVISIONS:  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

GEOHERMAL WELL DRILLING PERMIT  
Kapoho State No. 1

TO: Thermal Power Company  
601 California Street  
San Francisco, California 94108

Your application for a permit to drill a geothermal well as follows, on lands included in State of Hawaii Department of Land and Natural Resources Geothermal Resources Mining Lease No. R-2, is approved:

Well Designation: Kapoho State No. 1  
Location: TMK 1-4-01:2, Kapoho, Puna, Hawaii  
Leased to: Kapoho Land Partnership  
Subleased to: Thermal-Dillingham  
Operator: Thermal Power Company  
Drilling Contractor: Thermal Power Company  
Ground Elevation: 600'+  
Total Depth: 8000'

You are hereby granted permission to drill the geothermal well described above in accordance with the Department's Regulation 8 and the following conditions:

1. This permit shall become valid only upon receipt of:
  - a. A Multi-Well Indemnity Bond in the amount of \$250,000.
  - b. A fully and properly executed Designation of Agent form.

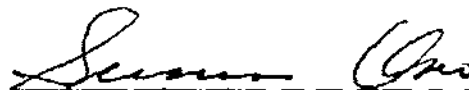
2. All work shall be performed in accordance with the Drilling and Completion Procedures submitted with your application, the Department's Regulation 8, and all other applicable Federal, State, and County laws, ordinances, rules and regulations.

3. If there are any contemplated changes in the proposed drilling operations or work, the applicant shall obtain the Chairman's approval prior to the execution of any such contemplated changes of work.

4. After drilling first reaches a depth of approximately 30 feet below sea level a one-gallon representative sample will be obtained and the elevation of the true ground water level established.

5. The Department shall be notified, with reasonable time allowed for travel to the site, to measure and/or verify the measurement of the static water level.

6. Under Items 7.(d) and 10.(e) of the Drilling Program, the open hole shall be logged for caliper, temperature, and borehole fluid resistivity.



SUSUMU ONO, Chairman  
Board of Land and Natural Resources

3/19/81  
Date of Permit

bcc: Hawaii County Planning  
" " Dept of Water Supply  
State Dept of Health  
Land Management

GEORGE R. ARIYOSHI  
GOVERNOR OF HAWAII



DIVISIONS:  
CONVEYANCES  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF LAND MANAGEMENT  
P. O. BOX 621  
HONOLULU, HAWAII 96809

March 10, 1981

Mr. W. L. D'Olier  
Vice President  
Geothermal Operations  
ECO Thermal Power Company  
601 California Street  
San Francisco, CA 94108

Dear Mr. D'Olier:

This is to inform you that at its meeting of March 13, 1981, the Board of Land and Natural Resources approved your plan of operations for the two exploratory geothermal wells identified as Kapoho State No. 1 and Kapoho State No. 2. A copy of the Board action is enclosed.

Very truly yours,

JAMES J. DETOR  
Land Management Administrator

Enclosure

cc: Hawaii Board Member  
Hawaii District Land Office  
/DOWALD

JJD:yd

# PUNA GEOTHERMAL VENTURE

A Hawaii Partnership

June 21, 1993

Keith W. Ahue, Chairperson  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, HI 96809

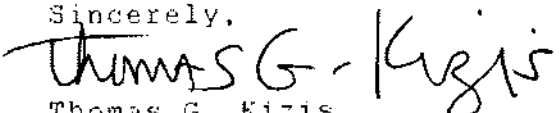
SUBJ: KS-1 PLUG AND ABANDON COMPLETION REPORT

Dear Mr. Ahue,

Pursuant to the KS-1 PLUG AND ABANDONMENT PROGRAM approved by DLNR on March 10, 1993, Puna Geothermal Venture hereby submits the required completion report.

Should you or your staff have any questions, please contact me.

Sincerely,

  
Thomas G. Kizis  
Environmental Manager

c: H. Tagomori  
S. Morris  
G. Davidson  
Drilling  
Mesquite

File: KS-1

# KS-1 P & A HISTORY

**LOCATION:** 8942' N & 9838' E OF THE KALIU BENCHMARK  
**ELEVATION:** 613' ABOVE MSL. ALL DEPTHS RKB, 25' ABOVE G.L.

05/01/93 Depth 7290'  
Moved in and rigged up Parker Drilling Company Rig #231.

05/07/93 Depth 7290'  
Rigged up. Rig on day rate at 2300 hours. Function tested blow out prevention equipment. Ran in hole picking up 3½" drill pipe.

05/08/93 Depth 7290'  
Ran in hole picking up 3½" drill pipe to top of cement plug at 1721'. Attempted to fill hole with water. Water level remaining at 650'. Rigged up Halliburton and pumped 10 barrels of water ahead followed by 50 cubic feet of Hawaiian cement premixed with 40% SSA-1, 0.65% CFR-3 and 3% calcium chloride. Displaced with 6 barrels of water. Pulled out of hole and waited on cement 4 hours. Ran in hole to top of cement at 1497'. Pulled out of hole. Removed blowout prevention equipment and expansion spool. Removed bit guide, packing and casing centralizer. Inspected cement around 7" casing. Unable to pull 7" casing. Reinstalled expansion spool and blowout prevention equipment. Halliburton pumped from surface 20 barrels of water ahead followed by 200 cubic feet Hawaiian cement premixed with 40% SSA-1, 0.65% CFR-3 Displaced with 5 barrels water. Shut in wellhead pressure was -4 psi (vacuum). Waited on cement.

05/09/93 Depth 7290'  
Ran in hole with open ended drill pipe to 1497'. Pulled out of hole. Fluid level at 350'. Pumped 50 barrels of water. Fluid level at 240'. Closed blind rams. Halliburton pumped from surface 3 barrels of water and 250 ft<sup>3</sup> of Hawaiian cement premixed 40% SSA-1, 0.65% CFR-3 and 2% CaCl<sub>2</sub>. Displaced with 3 barrels of water. Waited on cement. Ran in hole with open ended drill pipe to 1497'. Pulled out of hole. Fluid level at 240'. Filled hole with 10 barrels of water. Waited on cement. Closed blind rams. Howco pressure tested casing to 1500 psi, pressure bled to 0 in 15 minutes. Ran in hole with open ended drill pipe to 218'. Howco spotted 25 cubic feet Hawaiian cement with 40% SSA-1, 0.65% CFR-3 and 2% CaCl<sub>2</sub> from 218' to 102'. Pulled out of hole. Closed blind rams and squeezed 4 barrels of cement with maximum pressure of 1500 psi and final pressure 900 psi. Pressure bled to 20 psi in 15 minutes. Shut in well. Waited on cement.

05/10/92 Depth 7290'

Pressure tested casing to 500 psi. Serviced leaks in 3" wing valve and 10" master valve. Pressure tested blow out prevention equipment and plug to 1500 psi, OK. Made up drilling assembly and ran in hole. Cleaned out cement from 223' to 324'. Ran in hole to 1497'. Tested casing to 500 psi surface pressure, OK. Cleaned out cement from 1497' to 1632'.

05/11/93 Depth 7290'

Cleaned out cement from 1632' to 1721'. Circulated hole clean with full returns. Performed casing integrity test to 500 psi surface pressure. Pressure bled off in 5 minutes. Tripped for open ended drill pipe to 1716'. Halliburton mixed and pumped 50 cubic feet of Hawaiian cement premixed with 40% SSA-1, 0.65% CFR-3 and 3% CACL<sub>2</sub>. Displaced cement with 9 barrels of water and pulled 7 stands of drill pipe. Attempted to squeeze 7 barrels away. Pulled out of hole and waited on cement. Ran in hole and tagged top of cement at 1312' (calculated fill with no cement squeezed out). Pulled open ended drill pipe to 529'. Halliburton mixed and pumped 50 cubic feet of Hawaiian cement premixed with 40% SSA-1, 0.65% CFR-3 and 3% CACL<sub>2</sub>. Displaced cement with 1 barrel of water. Pulled out of hole. Closed blind rams and squeezed 3 barrels away at 500 psi surface pressure. Waited on cement.

05/12/93 Depth 7290'

Mixed 10.5 PPG kill mud with cotton seed hulls. Cleaned out cement stringers from 371' to 500'. Cleaned out solid cement from 500' to 731'. Cleaned out cement from 1503' to 1742'. Circulated hole clean. Reconfigured pipe rams for snubbing operation. Rigged up power swivel.

05/13/93 Depth 7290'

Rigged up and tested power swivel. Cleaned out cement from 1742' to 1901' with power swivel and 10.5 PPG mud. Hit collapsed casing at 1901'. Tripped for 6" concave mill. Unable to pass 233' with mill. Tripped for 3 1/4" concave mill. Milled pilot hole from 1901' to 1931'. Tripped for 5 1/4" tapered mill. Cleaned out collapsing casing and pilot hole from 1811' to 1901'.

05/14/93 Depth 7290'

Milled out tight spot in 9 1/2" casing from 1901' to 1903' with power swivel and 10.5 PPG mud. Cleaned out cement to 1911' with 5 1/4" tapered mill. Tripped for 5 1/4" bit. Cleaned out cement from 1911' to 2312' with power swivel and 10.5 PPG mud. Ran in hole to top of 7" perforated liner at 3874'. Circulated hole. Had sulphur water at



surface with 75 ppm  $H_2S$  and 14,000 ppm  $CO_2$ . Shut in well and rigged up to abate using Halliburton to pump caustic through wing valve at  $\frac{1}{2}$  BPM. Circulated hole through choke. Opened rams and circulated hole clean. Tripped for open ended drill pipe and circulated hole. Had no  $H_2S$  at surface.

05/15/93 P.B. Depth 3307'

With open ended drill pipe at 3874', Halliburton pumped 5 barrels of water ahead followed by 106 cubic feet of Hawaiian cement premixed with 40% SSA-1 and 0.65% CFR-3. Displaced cement with 5 barrels of water and 22 barrels of mud. Pulled 7 stands. Shut well in and squeezed 2 barrels down hole at 1200 psi surface pressure. Waited on cement. Conditioned mud in storage tanks. Ran in hole to solid plug of barite and gel (calcium alumina silicate) at 3307'. Plugged pipe. Tripped to unplug  $3\frac{1}{2}$ " saw tooth single. Circulated and conditioned mud at 3307'. Ran pressure and temperature survey to 3290'. Pressure gradient was normal and the temperature at bottom was 187 degrees F.

05/16/93 P.B. Depth 500'

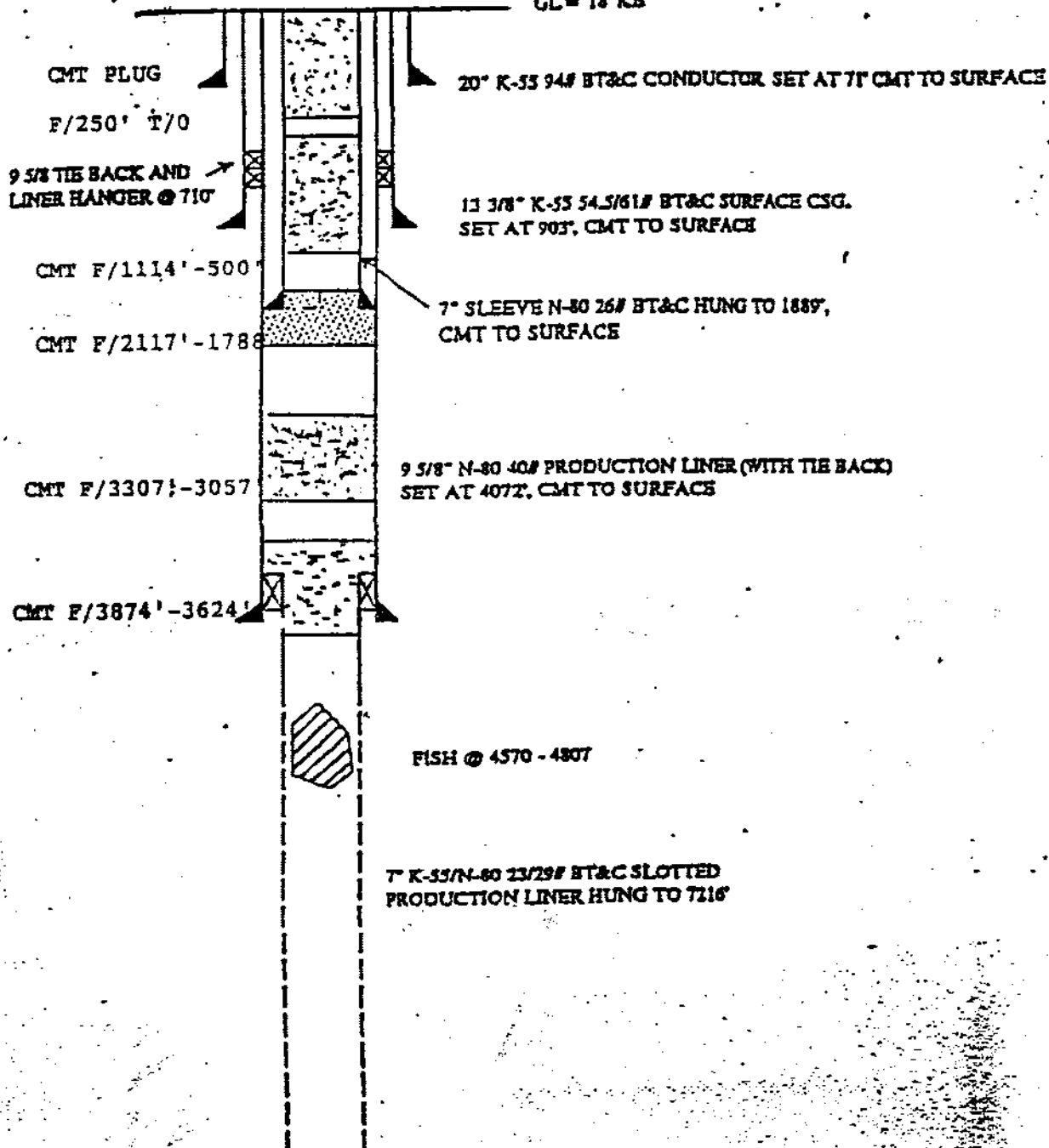
With pipe hung at 3307', Halliburton pumped 5 barrels of water ahead followed by 85 cubic feet of Hawaiian cement premixed with 40% SSA-1, 0.65% CFR-3 and 3% calcium chloride. Displaced cement with 5 barrels of water and 19.5 barrels of mud. Pulled drill pipe to 2117'. Halliburton pumped 86 cubic feet of Hawaiian cement premixed with 40% SSA-1, 0.65% CFR-3 and 3% calcium chloride. Displaced cement with 10 barrels of mud. Laid down excess drill pipe. Waited on cement. Tagged top of cement at 1788'. Pulled to 1114'. Halliburton pumped 2 barrels of water ahead followed by 129 cubic feet of Hawaiian cement premixed with 40% SSA-1, 0.65% CFR-3 and 3% calcium chloride. Displaced cement with  $\frac{1}{2}$  barrel water and  $1\frac{1}{2}$  barrels of mud. Laid down drill pipe and tools. Waited on cement. Tagged top of cement at 500'. All plug settings witnessed by Eric Tanaka, DLNR.

05/17/93 P.B. Depth Surface

Nippled down BOPE and master valve. Ran in hole with  $3\frac{1}{2}$ " drill pipe to 250'. Halliburton pumped 50 cubic feet of Hawaiian cement premixed with 40% SSA-1, 0.65% CFR-3 and 3% calcium chloride. Had good cement returns to surface. Pulled out of hole. Halliburton filled well bore with Hawaiian cement premixed with 40% SSA-1, 0.65% CFR-3 and 3%  $CaCl_2$  slurry to surface. Nippled down equipment and cleaned mud tanks. Released rig at 2400 hours. The P & A will be completed by cutting off the wellhead and welding a plate on the casing and removing then backfilling the cellar.

# PGV WELL KS-1

GL = 15 KB



DRILLERS TO = 7290'

WL

# PUNA GEOTHERMAL VENTURE

A Hawaii Partnership

RECEIVED

RECEIVED

90 JAN 5 P 3: 27

92 DEC 31 A 9: 56

December 29, 1992

DIV. OF WATER &  
LAND DEVELOPMENT

DIVISION OF WATER  
RECHARGE MANAGEMENT

*WLC to reply*

Mr. William Paty, Chairperson  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, HI 96809

SUBJECT: PROPOSED PLANS TO ABANDON WELLS KS-1 AND KS-2

Dear Mr. Paty,

As requested by staff from your Division of Water and Land Development on November 4, 1992, Puna Geothermal Venture (PGV) hereby submits plans to abandon wells Kapoho State 1 (KS-1) and Kapoho State 2 (KS-2) for your approval. These plans are pursuant to the requirements of Chapter 183 (Leasing and Drilling of Geothermal Resources), Subchapter 11, Sections 13-183-81 through 83.

We have been mandated to perform these abandonments as per your letter to PGV of December 13, 1991. We have subsequently requested an extension of time from the DLNR to complete these operations and have submitted the required change in plan of operation for your review and approval.

If your staff has any questions or would like additional information, please have them contact me.

Sincerely,

*Thomas G. Kizis*

Thomas G. Kizis  
Environmental Manager

TGK/sls

cc: J. Lewin (DOH)  
S. Morris  
M. Tagamori (DLNR)  
Drilling File  
Files: KS-1/KS-2  
Memo: A:21540.TK

RECEIVED  
DIVISION OF LAND & NATURAL RESOURCES  
STATE OF HAWAII

93 JAN 4 P12: 11

RECEIVED

## DEPARTMENT OF LAND AND NATURAL RESOURCES

DOCUMENT NO.

UAC OR ATTACHED WORKSHEET

DATE: January 11, 1993

F	YR	APP	D	SRC/ OBJ	COST CTR	PROJECT	PH	ACT	AMOUNT	NAME/DESCRIPTION (WANG INPUT)
G	00	000	C	1022	0741				(1) 200.00	Puna Geothermal Venture
									(2)	
									(3)	
									(4)	
TOTAL										

REMARKS: LINE (1) KS-1 & KS-2, P&A Plan fees

LINE (2)

LINE (3)

LINE (4)

01/11/93 \*0056\* CHECK 200.00

A GEOTHERMAL VENTURE

DETACH AND RETAIN THIS STATEMENT  
 THE ATTACHED CHECK IS IN PAYMENT OF ITEMS DESCRIBED ABOVE.  
 IF NOT CORRECT PLEASE NOTIFY US PROMPTLY. NO RECEIPT DEF.

DELUXE FORM WVC-2 V-2

DATE	DESCRIPTION	AMOUNT
12/18/92	2231 - KS-1 & KS-2, P&A Plan Fees 799:6161	\$200.00

V-2

01/11/93 \*0056\* CHECK 200.00

## PGV WELL KS-1

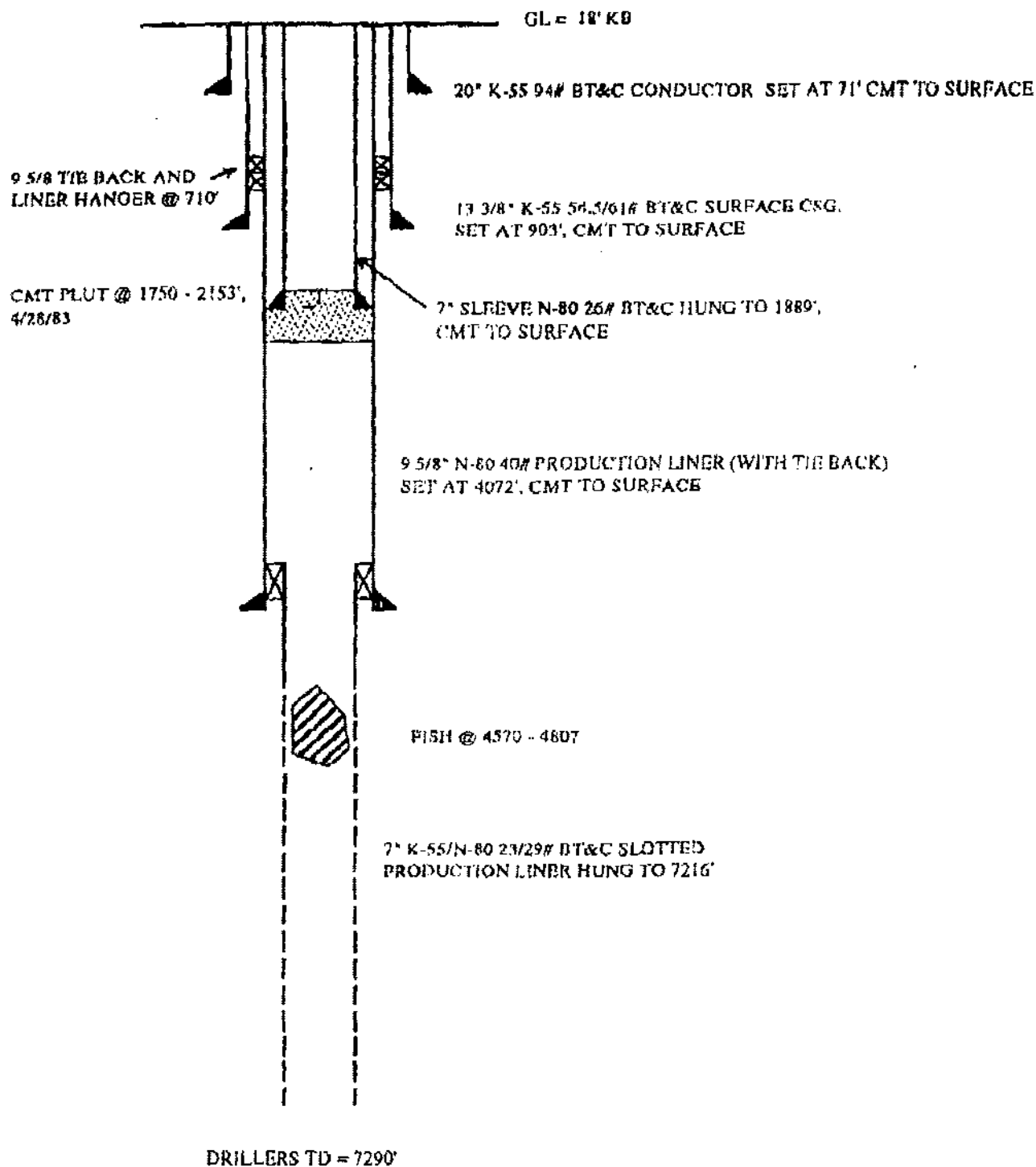


Figure 2

# ***PUNA GEOTHERMAL VENTURE***

*A Hawaii Partnership*

---

December 30, 1992

John C. Lewin, M.D., Director  
State Department of Health  
P.O. Box 3378  
Honolulu, HI 96801

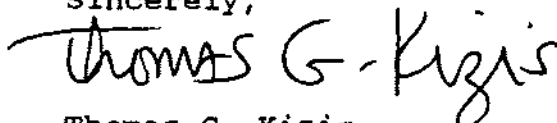
SUBJ: PLUG AND ABANDON PLANS FOR WELLS KS-1, KS-2 AND KS-8

Dear Dr. Lewin,

Attached for your information are our plug and abandon plans for wells Kapoho State 1, 2 and 8. These plans have been submitted to DLNR for their review and approval.

If you have any questions, please contact myself or the staff at the DLNR Division of Water and Land Resources.

Sincerely,



Thomas G. Kizis  
Environmental Manager

TGK/sls

cc: T. Arizumi (DOH)  
S. Morris  
Drilling File  
File: KS-1, KS-2, KS-8  
Memo: A:21542:TK

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KS-1 P & A PROGRAM

12/29/92

83 MAR 1 P 2: 06

1. Move in and rig up a suitable workover unit.
2. ~~WATER & DEVELOPMENT~~ Install and test BOPE above the 10" - 300 master valve.
  - A. BOPE will consist of pipe and CSO rams, annular preventor and stripper.
  - B. Have test witnessed by DLNR.
3. Rig up to drill out temporary suspension plug above the shoe of the 7" casing.
  - A. Use the existing KS-9 sump and baroid 100 bbl mixing tank.
  - B. Use a 6" or smaller bit.
  - C. Cement is estimated to be from 1750' to 2153'.
  - D. Well schematic attached.
4. Be prepared to kill well while drilling cement, and kill well after drilling cement. Keep well dead with water.
5. RIH with bit to top of 7" perforated liner at approximately 3870' and POH.
6. RIH open ended to the 9-5/8" shoe at 4072'.
7. Displace a minimum of 200 lineal feet of cement with silica flour and retarders as required.
  - A. If necessary, squeeze cement out of 9-5/8" shoe with surface pressure.
  - B. Tag cement after it sets.
8. Displace a minimum of 250 lineal feet of silica flour cement inside the shoe of the 9-5/8" casing (come at least 50' above the top of the 7" liner).
  - A. Tag the plug after it sets.
  - B. Have plug setting and tagging witnessed by DLNR.

9. Pressure test casing

- A. Fill well with fluid and apply pressure at wellhead to simulate cement plugs and mud hydrostatic pressure
  - B. Hold Pressure for 30 minutes.
  - C. If casing hold enough pressure to support mud and cement and no pressure drop occurs, set plug as follows: Mud from 3800' to 2100', cement to 1700', mud to 1100', cement to 500', mud to 280' and cement to 50'.
10. If drop in casing test pressure recorded, tag the cement plugs in step 9 or circulate cement off the top of each plug as directed by DLNR representative.
11. Fill all open annuli solid with cement to the surface.
12. Rig down and move off.
13. Cut off casing at the bottom of the cellar.
14. Fill casing from 50' to surface with redi-mix cement and weld plate on top of cut off.
15. Remove cellar and restore surface location, as near as practicable, to its original condition.



## PUNA GEOTHERMAL VENTURE

Page 1

WELL STATUS REPORT  
EXISTING PRODUCTION WELLS  
PUNA GEOTHERMAL VENTURE SITE

The following is a summary of the current status of the existing production well located on the Puna Geothermal Venture designated project area. The well locations are shown in Figure 1.

## 1. KS-1 (Figure 2)

Production well KS-1 was plugged with cement by Thermal Power on April 28, 1983. The plug was set from a depth of 1750 feet to a depth of 2153 feet. The well is completed with a single 2000# master gate valve which is maintained in the closed position and is locked. Wellhead pressure is stable at 6 psi. The gas observed when the pressure is bled through the side valve contains no H<sub>2</sub>S.

## 2. KS-2 (Figure 3)

Production well KS-2 was plugged with cement by Thermal Power on March 29, 1983. The plug was set from a depth of 2984 feet to a depth of 3175 feet. The well is completed with a single 2000# master gate valve which is maintained in the closed position and is locked. There is no pressure at the wellhead.

## 3. KS-1A (Figure 4)

Production well KS-1A was plugged with cement by Puna Geothermal Venture on June 1, 1989. The plug was set from a depth of 3542 feet to a depth of 3692 feet. The well is completed with two 3000# master gate valves which are maintained in the closed position and are locked. There is no pressure at the wellhead.

## 4. KS-3 (Figure 5, 6)

Production well KS-3 was completed by PGV on January 25, 1991. The well was drilled to a measured depth 7406 feet. A 511' fish was left in the bottom of the hole. The well is currently shut in with water in the casing to the wellhead. The wellhead pressure is 5 psi. No gas cap has been observed to date.

## 5. Injection Well KS-7 (Figure 7, 8)

KS-7 was spudded on January 30, 1991. 13-3/8" K-55 54# BT&C casing was set and cemented to 1020 feet. During the drilling of the 12-1/4" hole, an unanticipated high temperature, high pressure zone was encountered in the 1500

## PUNA GEOTHERMAL VENTURE

Page 2

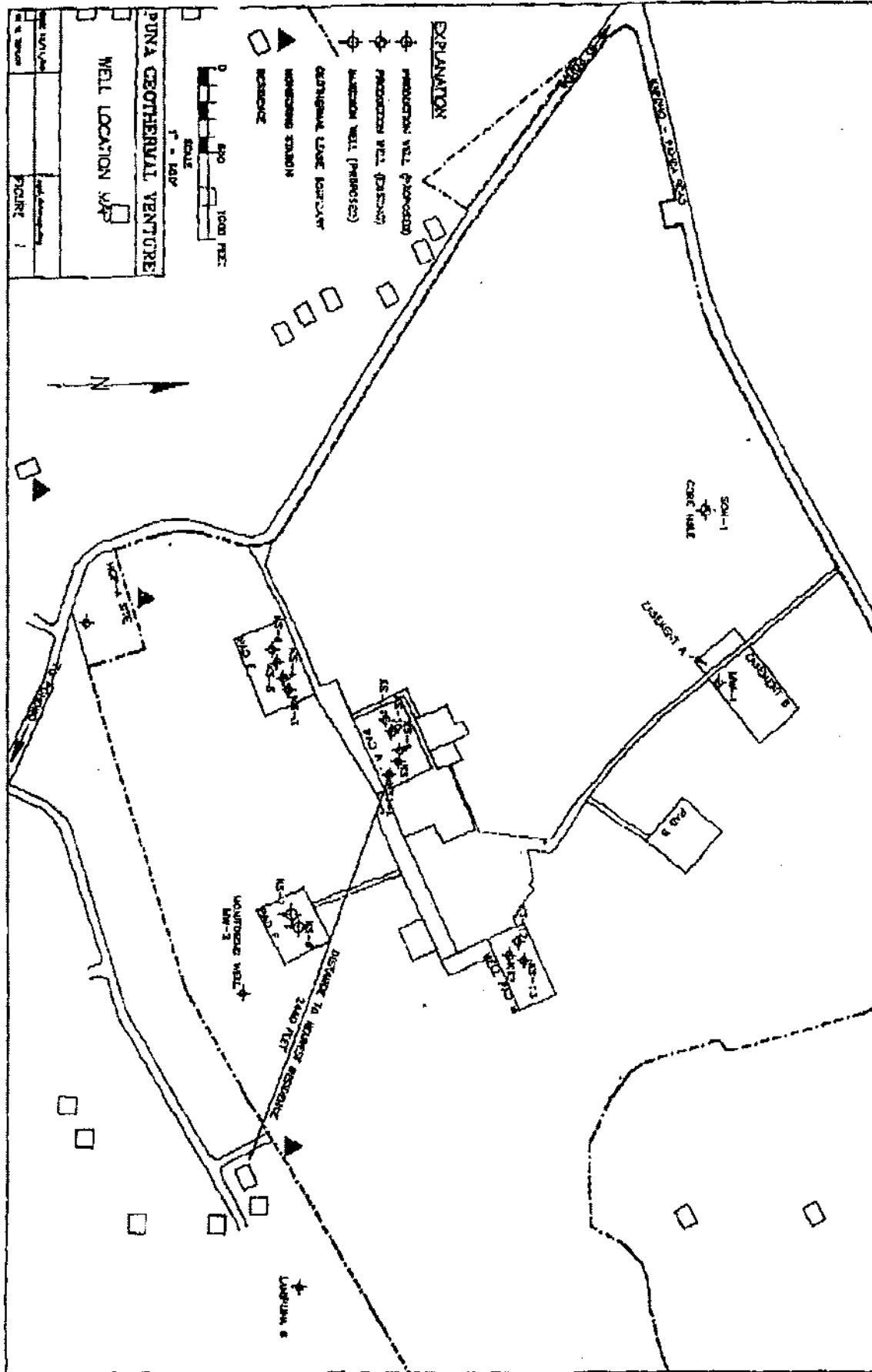
foot to 1678 foot interval. The hole bridged at a depth of 1277 feet. A cement plug was placed from 1277 feet to a depth of 740 feet. Drilling operations are currently suspended for this well with the rig on the hole and the BOP in place. Pressure and temperature in the casing and adjacent monitoring well MW-2 are being monitored daily. No H<sub>2</sub>S gas has been detected from either well.

6. Monitoring\Water Supply Well MW-1 (Figure 9)

MW-1 was completed by PGV on December 30, 1990 to a depth of 731 feet. A 75 hp submersible pump was installed and the well was put in service to supply water for production drilling operations and fire protection. The well is also sampled periodically as part of the Hydrologic Monitoring Program.

7. Monitoring Well MW-2 (Figure 10)

MW-2 was completed on January 21, 1991 to a depth of 646 feet. The well completed with 4" pipe which is perforated in the bottom 50 feet. The well is sampled periodically as part of the Hydrologic Monitoring Program.



123  
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50  
90 001 19 A7: 26

October 15, 1990

LAND AND NATURAL RESOURCES  
STATE OF HAWAII

Mr. William Paty  
Chairperson  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, HI 96809

Subject: Puna Geothermal Venture  
Quarterly Well Monitoring Report

RECEIVED  
90 001 29 A6: 40  
DIV. OF WATER &  
LAND DEVELOPMENT

Dear Mr. Paty,

As requested by the Department of Land and Natural Resources (DLNR), Puna Geothermal Venture (PGV) respectfully submits the following quarterly well reports for Kapoho State 1, Kapoho State 1A and Kapoho State 2.

The results of the attached well reports indicate that the wellhead pressures for each of the PGV wells remained static during the previous three months. No H<sub>2</sub>S was detected at any of the wellheads. All master valves and side valves for the three wells were serviced, function tested, and found to be in good operating condition. If there are any questions, or if more information is required, please feel free to contact the PGV office in Hilo at 961-2786.

Sincerely,

*Bill Teplow*  
Bill Teplow  
Field Manager

Attachment

cc: B. Clark w/encl.  
Z. Reiss w/encl.  
J. Sternfeld w/encl.

PUNA GEOTHERMAL VENTURE CONSTRUCTION

P.O. Box 1337 • Hilo, Hawaii 96721-1337 • Telephone (808) 961-2786 • Facsimile (808) 935-5562

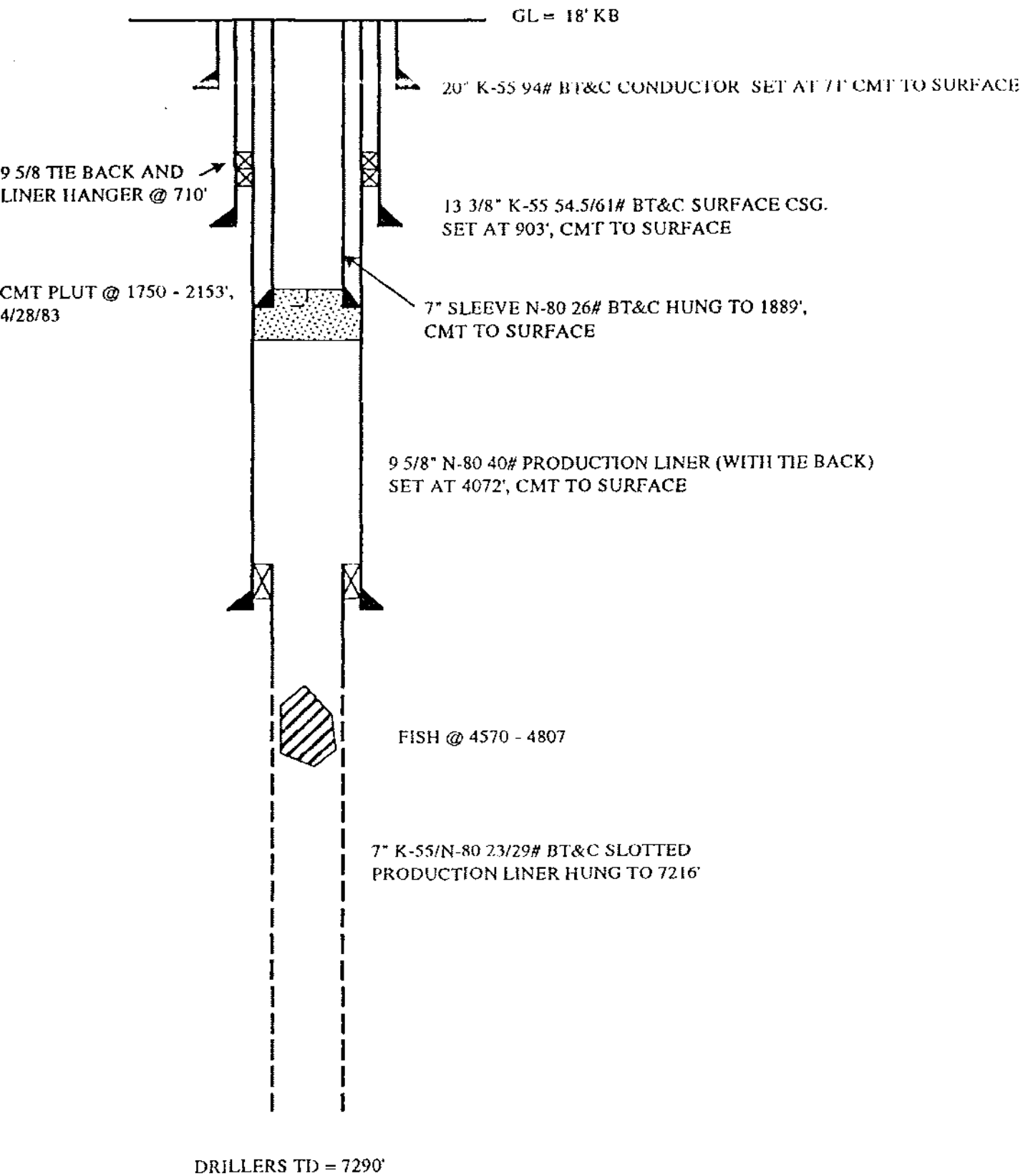
# QUARTERLY WELL REPORT

## KAPOHO STATE 1

Months Covered Under This Report: July, 1990 - September, 1990

Date	Pressure (psi)	Comments
July 02, 1990	< 1	
July 04, 1990	< 1	
July 08, 1990	< 1	
July 11, 1990	< 1	
July 15, 1990	< 1	
July 18, 1990	< 1	
July 22, 1990	< 1	
July 25, 1990	< 1	
July 29, 1990	< 1	
August 03, 1990	< 1	
August 06, 1990	< 1	
August 10, 1990	< 1	
August 13, 1990	< 1	
August 17, 1990	< 1	
August 20, 1990	< 1	
August 24, 1990	< 1	
August 27, 1990	< 1	
August 31, 1990	< 1	
September 03, 1990	< 1	
September 07, 1990	< 1	
September 10, 1990	< 1	
September 14, 1990	< 1	
September 17, 1990	< 1	
September 21, 1990	< 1	
September 24, 1990	< 1	
September 28, 1990	< 1	

# PGV WELL KS-1



ORMAT®



24 October 1988

Mr. William Paty, Chairman  
Board of Land & Natural Resources  
Kalanimoku Building  
1151 Punchbowl Street #220  
Honolulu, HI 96813

Lease/Drilling Bonds

Dear Mr. Paty:

Pursuant to State Administrative Rules Title 13, Chapter 183, Sections 34 and 68, we submit the attached bonds with Amor VIII Corporation as Principal and American Motorists Insurance Company as Surety. These new Amor VIII bonds will replace bonds previously submitted by Thermal Power Company

<u>Bonds</u>	<u>Ormat/Amor VIII</u>	<u>Thermal Power</u>
R-1 Performance bond	3SM 714 750 00	553 4472
R-2 Performance bond	3SM 714 751 00	553 4471
R-4 Performance bond	3SM 714 752 00	930 4593
Well Indemnity bond	3SM 714 749 00	567 7792

As always, if you have any questions regarding the above matter, or require additional information, please do not hesitate to call our office at 524-8940 through October 28th.

We are in the process of relocating our office to Hilo. After November 15, 1988 please forward any correspondence to us at:

Ormat Energy Systems, Inc.  
101 Aupuni Street Suite 1014-B  
Hilo, Hawaii 96720  
(808) 961-2184 Fax: 961-3531

Sincerely yours,

Maurice A. Richard  
Hawaii Regional  
Development Manager

encl  
MAR/cn:0034  
cc: M. Shimabukuro-DLNR

ORMAT ENERGY SYSTEMS, INC. 220 S. King St. #1750 Hon., HI 96813  
(808) 524-8940  
610 East Glendale Ave., Sparks, Nevada 89431-5811 • Telephone (702) 356-9111 • Facsimile (702) 356-9125 • Telex 170030

BOND NO. 3SM 714 749 00

**GEOHERMAL RESOURCES WELL INDEMNITY BOND**  
**(\$250,000 Statewide Well Bond)**

Premium \$7,500.00 Per Year

**KNOW ALL MEN BY THESE PRESENTS:**

That we, Amor VIII Corporation, as principal, and American Motorists Insurance Co. organized and existing under and by virtue of the laws of the STATE OF Illinois and authorized to transact surety business in the STATE OF HAWAII, as surety, are held and firmly bound unto the State of Hawaii in the full and just sum of TWO HUNDRED FIFTY THOUSAND AND NO/100 DOLLARS (\$250,000.00) lawful money of the United States of America, to be paid to the said State of Hawaii, for which payment, well and truly to be made, we do hereby bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Signed, sealed, delivered and dated this 7th day of October, 1988.

**THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT,**

WHEREAS, said principal is about to acquire, drill, redrill, deepen, operate, maintain or abandon a geothermal resources wells in the State of Hawaii and is required to file this bond in connection therewith in accordance with Rule 9.4 of Regulation 8 of the Department of Land and Natural Resources, State of Hawaii.

NOW, THEREFORE, if said Amor VIII Corporation, the above bounden principal, shall well and truly comply with all the provisions of said Regulation 8 and shall obey all lawful orders of the Chairman of the Board of Land and Natural Resources, or his representative, if not appealed to the Board of Land and Natural Resources, or upon affirmance thereof by the Board of Land and Natural Resources, if appealed thereto, and shall pay all charges, costs, and expenses incurred by the Chairman or his representative, in respect of such well or the property or properties of said principal, or assessed against such well or the property or properties of such principal, in pursuance of the provisions of said Regulation 8, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Amor VIII Corporation ✓

By: J. H. Z. M.

Approved as to forms

STATE OF CALIFORNIA, )  
COUNTY OF Los Angeles ) SS.



On this 7th day of OCT 07 1988, before me Angela A. Rego



**AMERICAN MOTORISTS INSURANCE COMPANY**

Home Office: Long Grove, IL 60049



**POWER OF ATTORNEY**

**Know All Men By These Presents:**

That the American Motorists Insurance Company, a corporation organized and existing under the laws of the State of Illinois, and having its principal office in Long Grove, Illinois, does hereby appoint \*\*\*\*\*  
**William J. Shupper of Los Angeles, California\*\*\*\*\***

its true and lawful agent(s) and attorney(s)-in-fact, to make, execute, seal, and deliver during the period beginning with the date of issuance of this power and ending December 31, 1988, unless sooner revoked for and on its behalf as surety, and as its act and deed: **Any and all bonds and undertakings provided the amount of no one bond or undertaking exceeds TWO MILLION DOLLARS (\$2,000,000.00)\*\*\*\*\***

**EXCEPTION: NO AUTHORITY is granted to make, execute, seal and deliver any bond or undertaking which guarantees the payment or collection of any promissory note, check, draft or letter of credit.**

This authority does not permit the same obligation to be split into two or more bonds in order to bring each such bond within the dollar limit of authority as set forth herein.

This appointment may be revoked at any time by the American Motorists Insurance Company.

The execution of such bonds and undertakings in pursuance of these presents shall be as binding upon the said American Motorists Insurance Company as fully and amply to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal office in Long Grove, Illinois.

**THIS APPOINTMENT SHALL CEASE AND TERMINATE WITHOUT NOTICE AS OF DECEMBER 31, 1988.**

This Power of Attorney is executed by authority of a resolution adopted by the Board of Directors of said American Motorists Insurance Company on May 20, 1981 at Long Grove, Illinois, a true and accurate copy of which is hereinafter set forth and is hereby certified to by the undersigned Secretary as being in full force and effect:

"VOTED, That the Chairman of the Board, the Chairman, the President, or any Vice President, or their appointees designated in writing and filed with the Secretary, or the Secretary shall have the power and authority to appoint agents and attorneys-in-fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings, obligatory in the nature thereof, and any such officers of the Company may appoint agents for acceptance of process."

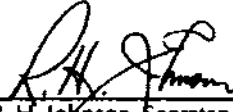
This Power of Attorney is signed, sealed and certified by facsimile under and by authority of the following resolution adopted by the Board of Directors of the Company at a meeting duly called and held on the 20th day of May, 1981:

"VOTED, That the signature of the Chairman of the Board, the Chairman, the President, any Vice President, or their appointees designated in writing and filed with the Secretary, and the signature of the Secretary, the seal of the Company and certifications by the Secretary, may be affixed by facsimile on any power of attorney or bond executed pursuant to resolution adopted by the Board of Directors on May 20th, 1981 and any such power so executed, sealed and certified with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding upon the Company."

In Testimony Whereof, the American Motorists Insurance Company has caused this instrument to be signed and its corporate seal to be affixed by its authorized officers, this 8th day of August, 19 86.

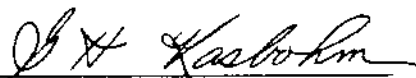
**Attested and Certified:**

**AMERICAN MOTORISTS INSURANCE COMPANY**

  
R. H. Johnson, Secretary



By

  
G. H. Kasbohm, Vice President

**STATE OF ILLINOIS  
COUNTY OF LAKE ss**

I, Olga W. Bennett, a Notary Public, do hereby certify that G. H. Kasbohm and R. H. Johnson personally known to me to be the same persons whose names are respectively as Vice President and Secretary of the American Motorists Insurance Company, a Corporation of the State of Illinois, subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that they being thereunto duly authorized signed, sealed with the corporate seal and delivered the said instrument as the free and voluntary act of said corporation and as their own free and voluntary act for the uses and purposes therein set forth.



  
Olga W. Bennett, Notary Public

My commission expires: November 18, 1988

October 7, 1987

Mr. Ralph A. Patterson  
Project Manager  
Thermal Power Company  
220 South King Street, Suite 1750  
Honolulu, Hawaii 96813

Dear Mr. Patterson:

In accordance with Section 13-183-6 of the Department of Land and Natural Resources' Administrative Rules on the Leasing and Drilling of Geothermal Resources, our Division will begin conducting bi-weekly inspections of geothermal wells--Kapoho State No. 1, 2, and 1-A.

Since vehicular access to the wells would facilitate inspection, we respectfully request a key to the access gate at the geothermal project site for use by our inspector on Hawaii, Mr. Morris Ota.

We look forward to your consideration and cooperation on this matter. Should you have any questions, please contact Mr. George Matsumoto at 548-7619.

Sincerely,

MANABU TAGOICHI  
Manager-Chief Engineer

DN:DL:dh

DOWALD

35



# **THERMAL POWER**

COMPANY

22 July 1983

13 JUL 83 P 1:45

Jere Denton  
Vice President  
Hawaii Project

DEPT. OF LAND & NATURAL RESOURCES  
STATE OF HAWAII

Mr. Susumu Ono  
Chairman  
Board of Land  
and Natural Resources  
Kalanimoku Bldg. Room 130  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

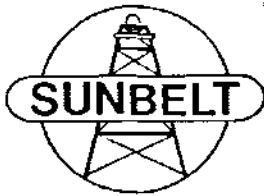
Dear Mr. Ono:

In your May 23rd letter requesting a report on the April 12th H<sub>2</sub>S incident on the Kapoho State #1 geothermal well location, you requested several items. One of the items requested was a copy of Water Resources International's report on the incident. I have subsequently had some conversations with Water Resources and learned that they have not prepared a separate report on the incident. In view of that, I have asked what measures they have taken since their drilling contract with us was completed which would insure that nothing similar could happen in the future. Their response has been to provide a copy of an invoice which lists safety equipment they have recently acquired.

Sincerely yours,

JMD/crn

cc: Mr. E. C. Craddick, Water Resources International  
Mr. W. L. D'Olier, Thermal Power Company



1964

Sunbelt Oil Field Services, Inc.

P. O. Box 14691

Baton Rouge, LA 70898-4691

№ 001166

INVOICE

Sold To:

WATER RESOURCES INTERNATIONAL

P.O. BOX 4398

HILO, HAWAII 96720

Service for:

Rig No: 4

Location: Hawaii

Sunbelt Job #:

RECEIVED

MAY 24 1983

BRN/WRI-HILO

Date	Date on	Date Off	Purchase Order No:		
5/20/83	5/18/83				
QUANTITY	DESCRIPTION	NO. OF DAYS	UNIT COST	TOTAL	
1 ea	TAC Model 303 H 2S Monitor with 4 heads	✓	4,000.00	4,000.00	
600 ft	Sensopr cable	✓	400.00	400.00	
1 ea	Junction Box	✓	300.00	300.00	
1 ea	TAC Model 3000 Calibrator w/ tubes	✓	1,200.00	1,200.00	
1 ea	Gas teck pump	✓	176.00	176.00	
10 bxs	H2S tubes (5 4l & 5 ea 4H)	✓	2.10	210.00	
2 ea	Scott 30 minutepak	1400.00	850.00	1,700.00	
1 ea	Robertshaw resuscitator	✓	614.00	614.00	
2 ea	Emergency strobe light & cble	700.00	175.00	175.00	
2 ea	Emergency siren and cable		175.00	175.00	
Freight and expenses to be billed on					
separate invoice					
Sub-Total			9,000.00	9,000.00	
Tax					
TOTAL			9,000.00	9,000.00	

5-24-83

CAP. EQUIP.

Ry-4

E-6011-

Net 30 days



**THERMAL POWER**  
COMPANY

25 May 1983

Jere Denton  
Vice President  
Hawaii Project

Mr. Susumu Ono  
Chairman  
Board of Land & Natural Resources  
State of Hawaii  
Kalanimoku Bldg. Rm. 130  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Dear Mr. Ono:

Enclosed is a report on the accident at the Kapoho State 1 geothermal well location on State Mining Lease R-2, which occurred on April 12, 1983. I believe it fully describes the actions which led to the accidental inhalation of H<sub>2</sub>S gas and the serious effort which has been made to ensure that a similar accident will never happen again. If you have any questions, please give me a call at 944-5545.

Sincerely yours,

enclosure

JMD/crn

cc: Sidney Fuke, Hawaii County Planning Dept.

## **PUNA GEOTHERMAL VENTURE**

**Thermal Power Company, Operator**

**Report on H<sub>2</sub>S Gas Incident on 12 April 1983  
Geothermal Well: Kapoho State 1  
Geothermal Resource Mining Lease No. R-2  
Puna District, Hawaii County, Hawaii**

Puna Geothermal Venture (PGV), Lessee under the referenced Lease No. R-2, completed two geothermal wells on this property in 1981 and 1982. Thermal Power Company, Operator for PGV, commenced remedial operations on the well Kapoho State 1 on April 5, 1983 utilizing the contracted services of Water Resources International, Inc., Drilling Rig No. 4 and its drilling crewmen employees. A Geothermal Drilling Permit extension was issued on March 18, 1983 for this specific work.

Well operations on Kapoho State 1 involved the difficult task of suppressing a 1250 psig shut-in wellhead pressure in order to access the wellbore for remedial work to improve casing conditions and the well's flowing capacity. This well produces, with its geothermal effluent, an H<sub>2</sub>S gas component of approximately 1100 parts per million concentration. The wellhead pressure suppression or "kill" task required water injection into 3" gates or sideports in the wellhead expansion spool. Following initial water injection efforts which did not much reduce wellhead pressure, a complete rework of the wellhead blowout prevention equipment (BOP) on April 11th was made by the drilling crews under Thermal's on site direction before resumption of water injection. This work proceeded under the Operator's orders to WRI that persons were not to enter the geothermal wellhead cellar without task specific instructions. The cellar, which encloses the wellhead, is a 10-foot square and 10-foot deep recess below ground level. It is the lowest point in the vicinity of the wellhead and is known to be a place where H<sub>2</sub>S could gather, if released.

Crewman Stanley De Mars, without notice, discussion or permission, entered the cellar alone about 3:30 a.m. on April 12th and opened a threaded union which connected a Chiksan 2" diameter flexible steel pipe line to a closed 3" gate on the expansion spool. This line had been used for water injection into the wellhead and was in its place, made up, not leaking, and attached to the wellhead because it was to be used for water injection following BOP checkout. De Mars removed a 2-foot piece of the Chiksan pipe and left the cellar for an estimated 15-minute time interval in which he discovered he had made a needless action. De Mars, again entered cellar, reportedly without notice or caution, and in attempting to reconnect the Chiksan pipe to the 3" gate, inhaled H<sub>2</sub>S, got dizzy and fell off a walkway and 3 feet down to the cellar floor. Fortunately, De Mars was heard or noticed and Rod Haili, intending immediate help, entered the cellar but also collapsed. A Thermal representative (a consulting drilling engineer), seeing this initial action, ran immediately for one of several Scott airpack respirators which throughout all PGV drilling, flow testing and remedial operations, have been maintained on site. Two additional crewmen, Ahuna and Hauanio, then entered the cellar without protection, and fortunately got De Mars, Haili and themselves out of the cellar. The Scott respirator arrived at the wellhead as the four men were exiting the cellar. All four men, stunned by the H<sub>2</sub>S gas, had to rest and clear their lungs. Prompted by both the WRI supervisor and the Thermal representative, they then drove themselves to the Hilo Hospital for medical examinations by a duty doctor, Dr. Fred Holschuh. Two of the crewmen returned to the rig by 6:00 a.m. on April 12th, one went home at that time, and De Mars remained several hours longer in the hospital for further evaluation of his back and head pains from his fall.

The H<sub>2</sub>S gas which impacted the four crewmen in the cellar gathered there after the 2-foot piece of the Chiksan line was disconnected from the 3" gate. The gate was known to leak trace amounts of H<sub>2</sub>S gas when fully closed. However, no gas was known to be leaking into the cellar when the Chiksan pipe was securely connected to the 3" gate. The piping was being maintained in this securely connected position in order to continue with water injection after the BOP checkout.

Thermal's review indicates that the drilling crew involved had a long accident free record working together, through the original drilling and completion of both Kapoho State 1 and 2 and the following remedial operations. This amounts to more than 170-days of rig operations under contract to Thermal Power Company. We regard WRI crews to be proficient, hardworking and generally responsive to instructions. Thermal had also employed another contractor, Ex Log Smith, during flow test activity to monitor H<sub>2</sub>S levels, run the abatement system and, if required, to direct the use of the Scott respirators. Although Thermal had hired Ex Log Smith and EAL to implement specific safety and environmental programs on the wellsites, the WRI crew's safety record on our project did not lead us to initiate discussions with the drilling contractor on the training of their rig crews. The April 12th event clearly indicated our misjudgement of the level of crew training.

Within a week of the accident, Thermal, at the expense of PGV, sent in Environmental Safety, Service and Equipment (ESSE International, Inc.), a firm which provides H<sub>2</sub>S handling and safety services for the worldwide petroleum industry. In the time interval of April 19 through 21, ESSE trained all three WRI drilling crews at the Kapoho State 1 wellsite plus other persons (total of 31) in H<sub>2</sub>S safety precautions and in Scott airpack utilization. Before initiating well site operations on another Kapoho State wellsite, Thermal will effect, or require the drilling contractor to effect, another structured H<sub>2</sub>S safety training program for drilling contractor personnel. Thermal will invite appropriate Hawaii agencies to participate in this additional training.

Copies of the OSHA citations issued to the drilling contractor are attached to this report.

WLD/NAN/ikl  
05/24/83





**WATER RESOURCES INTERNATIONAL, INC.**

2828 PAA STREET, SUITE 2085 • HONOLULU, HAWAII 96819  
TELEPHONE (808) 839-7727 • TELECOPIER (808) 833-5577 • TELEX 7238672

May 24, 1983

Mr. Susumu Ono, Chairman  
Board of Land and Natural Resources  
P. O. Box 373  
Honolulu, Hawaii 96809

Reference: Kapoho State Well No. 1  
Thermal Power Company

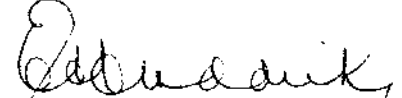
Dear Mr. Ono:

We received a copy of Thermal Power Company's letter of May 12, 1983, which was addressed to you, and wish to briefly comment insofar as it pertains to Water Resources International.

1. Water Resources International (WRI) was performing the work as contractor under the direction of the operator, Thermal Power Company (TPC), with specific instructions not to disclose any job information, except through the operator. The primary cause of H<sub>2</sub>S presence in the cellar is therefore a matter for discussion with the operator.
2. Although Scott personal respiratory equipment was located at the site, it was locked up and not available for our personnel to use.
3. Additional measures were initiated at the TPC site, and are also included in our Lanipuna Well site where we are presently working, which we feel are adequate should the presence of H<sub>2</sub>S be again encountered.
4. We also wish to take exception to any implication that WRI bears the responsibility for the H<sub>2</sub>S incident.

Very truly yours,

WATER RESOURCES INTERNATIONAL, INC.

  
E. C. Craddick, President

ECC/sm

cc: Thermal Power Company  
Mr. M. Kinzler - New York  
Mr. D. J. Otwell - Honolulu

cc: Tagomori



# **THERMAL POWER**

COMPANY

12 May 1983

Mr. Susumu Ono, Chairman  
Board of Land and Natural Resources  
Kalanimoku Bldg. Rm. 130  
1151 Punchbowl St.  
Honolulu, Hawaii 96813

Re: Geothermal Well: Kapoho State 1  
Geothermal Resource Mining Lease  
No. R-2  
Puna District, Hawaii

Dear Mr. Ono:

On April 12th at the Kapoho State 1 well site, four of our drilling contractor's crewman were affected by an accidental release of gas containing  $H_2S$ . One crewman was affected while working within the geothermal wellhead cellar. The other three crewmen were affected while assisting the first out of the cellar. Fortunately, the incident did not result in any serious injuries or lasting effects to the crewmen.

Puna Geothermal Venture is vitally concerned about safety for all workers on our well sites. Although roughly 170 accident-free days of drill rig operation on our Kapoho State wells by Water Resources International, Inc. (WRI) preceded this event, some immediate measures have been taken by Thermal Power Company, Operator, to further reduce the possibility of accidental  $H_2S$  exposure.

1. Previous instructions for WRI crews not to enter the geothermal wellhead cellars without task specific instructions have been repeated to WRI crews, supervisors and management. We are providing copies of Safety Orders for Drilling and Production of the California Division of Industrial Safety to WRI for our joint use in making all persons aware of safe work practices.
2. Environmental Safety Service and Equipment International, Inc., of Houston, a firm specializing in  $H_2S$  safety programs, was brought out by Thermal Power Company on April 19-21 to provide safety training to each member of the three drill rig crews and others, (approximately 31 people). The Kapoho State 1 operations concluded, without further incidents, on April 28th when the contractors drill rig and crews were released.

Mr. Susumu Ono  
Page Two  
12 May 1983

3. Scott personal respiratory equipment was on site during the event. Additional new and lighter Emergency Life Support Apparatus, (ELSA) face masks will be provided along with individual instructions. These will be placed in locations immediate to the geothermal wellhead cellar when we again utilize a drill rig.

A news release is being made by Thermal Power Company now that the Occupational Safety and Health Administration's report has been released. Thermal Power Company will continue to pursue active safety programs both directly and through our contractors. We would be happy to include representatives from your agency in future safety training programs. If you have any questions please call me at (415) 765-0449.

Sincerely yours



W. L. D'Olier  
Vice President

WLD/ikl

cc: County Civil Defense Director  
County Planning Department  
Department of Health  
Dept. of Planning & Econ. Dev.  
Amfac Energy, Inc.  
Dillingham Geothermal, Inc.  
Water Resources International, Inc.

STATE DEPARTMENT OF LABOR & INDUSTRIAL RELATIONS  
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH  
677 ALA MOANA, SUITE 910 HONOLULU, HAWAII 96813  
CITATION and NOTIFICATION OF PENALTY

1. ISSUANCE DATE	2. OSHCO	OSHL-1 No.
5/6/83	Y0816	31-83
3. REGION	4. AREA	5. PAGE
09	1501	1 OF 1

TYPE OF VIOLATION(S)	CITATION NO.
SERIOUS	1

TO: Water Resources International Inc.  
2828 Paa Street, Suite 2085  
Honolulu, Hawaii 96819

INSPECTION DATE: 4/12/83

INSPECTION SITE: Geothermal Well  
at Kapoho State #1  
THE LAW REQUIRES that a copy of  
this Citation be posted immediately in  
a prominent place at or near the loca-  
tion of the violation(s) cited below. The  
Citation must remain posted until the  
violations cited below have been cor-  
rected, or for 3 working days, which-  
ever is longer.

PROPOSED  
PENALTIES  
ARE DUE  
WITHIN 20  
DAYS OF  
RECEIPT  
OF THIS  
NOTIFICATIO  
UNLESS  
CONTESTED

(See Instru  
Sheet)

This Section M  
Be Detached  
Before Posting

This citation describes violations of the Hawaii Occupational Safety and Health Law. Any proposed penalty listed below is based on these violations. You must correct the violations referred to in this citation by the dates listed below and pay the penalties proposed, unless within 20 days from your receipt of this Citation and Notification of Proposed Penalty you mail a notice of contest to the administrator at the address shown above.

8. ITEM NUMBER STANDARD, RULE OR SECTION OF THE LAW VIOLATED:	DESCRIPTION	9. DATE BY WHICH VIOLATION MUST BE CORRECTED	10. PENALTY
1a §12-61-2(f)	Employees required to enter confined or enclosed spaces were not instructed as to the nature of the hazards involved (toxic contaminants), the necessary precautions to be taken, and the use of protective and emergency equipment required.  Location: Jobsite.	5/11/83	\$135
1b §12-64-2(a)	Respiratory devices were not used by employees exposed to hydrogen sulfide.  Location: Jobsite.	5/11/83	
1c §12-64-6(e)(3)	Written procedures covering the safe use of respirators in normal operations or in emergencies were not prepared and made available to personnel.  Location: Jobsite.	5/11/83	
1d §12-64-6(e)(3)(A)	No planning was done for emergency rescue in an area where employees could be overcome by toxic atmosphere, i.e. planning should be such that one individual would be unaffected by any likely incident and have the proper rescue equipment to assist the other employees.  Location: Jobsite.	5/11/83	

RECEIVED  
MAY 09 1983

WATER RESOURCES  
The above alleged violations have been grouped because they involve similar or related hazards that may increase the potential for injury resulting from an accident.

cc: Bill Craddock - Hills  
G. Long - Hon.  
5/10/83

REF: Hawaii Occupational Safety and Health Standards,

STATE DEPARTMENT OF LABOR & INDUSTRIAL RELATIONS  
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH  
677 ALA MOANA, SUITE 910 HONOLULU, HAWAII 96813  
CITATION and NOTIFICATION OF PENALTY

1. ISSUANCE DATE	2. OSHCO No.	OSHL-1 No.
5/6/83	Y0816	31-83
3. REGION	4. AREA	5. PAGE
09	1501	1 OF 1

TYPE OF VIOLATION(S)	CITATION NO.
GENERAL	2

TO: Water Resources International Inc.  
2828 Paa Street, Suite 2085  
Honolulu, Hawaii 96819

INSPECTION DATE: 4/12/83

INSPECTION SITE: Geothermal Well  
at Kapoho State #1

THE LAW REQUIRES that a copy of this Citation be posted immediately in a prominent place at or near the location of the violation(s) cited below. The Citation must remain posted until the violations cited below have been corrected, or for 3 working days, whichever is longer.

PROPOSED PENALTIES ARE DUE WITHIN 20 DAYS OF RECEIPT OF THIS NOTIFICATION UNLESS CONTESTED

(See Instruction Sheet)

This citation describes violations of the Hawaii Occupational Safety and Health Law. Any proposed penalty listed below is based on these violations. You must correct the violations referred to in this citation by the dates listed below and pay the penalties proposed, unless within 20 days from your receipt of this Citation and Notification of Proposed Penalty you mail a notice of contest to the administrator at the address shown above.

This Section Be Described Before Posting

8. ITEM NUMBER STANDARD, RULE OR SECTION OF THE LAW VIOLATED:	DESCRIPTION	9. DATE BY WHICH VIOLATION MUST BE CORRECTED	10. PENALTY
1 §12-72-3(c)(1)	Open-sided floor was not guarded by standard railings or equivalent protection.  Location: Cellar.	5/11/83	0
2 §12-72-3(c)(2)	A grit strut grating that was used as a platform, was not at least 18 inches wide.  Location: In cellar.	5/12/83	0
3 §12-82-2(b)(8)	The side rails of a ladder did not extend at least 36 inches above the landing (portable fabricated 9 ft. metal ladder).  Location: In cellar.	5/11/83	0
4 §12-82-2(b)(9)	Portable ladder in use was not tied, blocked or otherwise secured to prevent its being displaced (fabricated 9 ft. metal ladder).  Location: In cellar.	5/11/83	0

Total Citations 1 & 2 :

\$135

REF: Hawaii Occupational Safety and Health Standards.

April 14, 1983

Sus,

Thermal Power Company followed-up with the attached written notice of work activities on the same day after telephoning us on April 7th.

The nine-point work tasks outlined in the written notice are aimed to:

1. repair casing at approximately 650-foot depth, and
2. recover 4" drill pipe at 4570-foot depth.

No open venting has occurred or planned. To our knowledge, all work is proceeding in accordance with DLNR regulations.

Thermal Power Company has kept us informed of their progress and as of 4/14/83, work is continuing without any complaints from the community.

We are continuing to monitor the current work and reports of the repair and recovery work will be forthcoming from the operator of the geothermal well.

Bob C.



**THERMAL POWER**  
COMPANY

7 April 1983

Jere Denton  
Vice President  
Hawaii Project

Mr. Susumu Ono  
Chairman  
Board of Land and  
Natural Resources  
Kalanimoku Bldg. Room 130  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Attention: Mr. Manabu Tagomori

Dear Mr. Ono:

Attached is the proposed remedial program for Kapoho State I geothermal well which is designed to repair what is believed to be a small leak at approximately 650'. In addition to the repair of the leak, we propose to attempt one more time to recover the 4" drill pipe fish located at approximately 4600'. If there are any questions or other information which I can provide, I will be pleased to do so.

Sincerely yours,

A handwritten signature in dark ink, appearing to read 'Jere Denton'. The signature is fluid and cursive, with a large loop at the end.

JMD/crn

attachment

Handwritten: 1861

RECEIVED

93 APR 7 AIO: 42

DEPT. OF LAND  
& NATURAL RESOURCES  
STATE OF HAWAII

RECEIVED  
DEPT. OF LAND  
& NATURAL RESOURCES  
STATE OF HAWAII

8  
APR 7 1983

RECEIVED

**Geothermal Well: Kapoho State 1**

Location: TMK 1-4-01-02  
Kapoho, Puna, Hawaii County  
Elevation: 618.77' GL  
Total Depth: 7290'

**Casing Depth: below KB**  
20" to 71'  
13-3/8" to 900'  
9-5/8" to 4072'  
7" perfed liner 3898-7216'  
7" sleeve 0-1898'

**Status:** Shut in with  $\pm 1250$  psig wellhead pressure, not on bleed.

**WELL PROGRAM: Recover Fish and Repair Low Rate Leakage**

1. Move in and rig up rotary drilling equipment.
2. Remove upper master valve. Install BOE stack, consisting of spool, double hydraulic gate (with pipe rams and blind rams), Hydril and Grant rotating head.
3. Hook up rig pumps to side outlets on wellhead and spool with blind rams closed, pump water into well at maximum rate and kill well. Run 6" bit on 3½" drill pipe if well is not killed. Run to top of 7" liner, pump in water and kill well. Utilize a brine solution if required.
4. Run in with fishing assembly; attempt recovery of 4" drill pipe fish below 4570'.
5. Run in open ended with 3½" drill pipe to 1000 feet and lay in 100 lineal foot cement plug. WOC 12 hours and pressure test with 1500 psig for 15 minutes.
6. Rig for squeeze cementing. With 3½" drill pipe at 640 feet, pump, mix and squeeze 100 cu. ft. volume of 15.5 to 16 ppg cement slurry. WOC 24 hours.
7. Clean out with 6" bit to 1000 feet. Pressure test cemented exits with 1500 psig for 15 minutes. If pressure fails, repeat steps 5 and 6.
8. If pressure holds, drill out cement plug below 1000 feet and clean out to top 7" liner at 3981 feet.
9. Install upper master valve and release rig.

WLD/ikl



4/14/83

SUS:

I have researched this matter and have found the following:

I ✓  
o No venting has occurred on this Kapoho State 1 well.

o Work on Kapoho No. 1 is still in progress and the work involves:

- Reduce well head pressure
- Repair casing leak
- Recover 4" drill pipe below 4570-ft. depth

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4/14/83

SUS:

I have researched this matter and have found the following:

- o No venting has occurred on this Kapoho State 1 well.
- o Work on Kapoho No. 1 is still in progress and the work involves:
  - Reduce well head pressure
  - Repair casing leak
  - Recover 4" drill pipe below 4570-ft. depth
- o No complaints have been received from the public
- o The work presently being done on Kapoho No. 1 is covered by DLNR approvals.
- o With regard to possible venting in the future which would cause noise and disturbance to the community as shown on the attached listing, well program No. 5 calls for a pressure test with 1500 psig for 15 minutes.

We called Jere Denton today and he assured us that a muffler will be placed on the pipe to muffle all noises during the 15-minute test.

8/13/83

Bob:  
What happened  
to Thermal Power's  
"emergency" request  
to vent well #1?

me

Call line Darden ~

Bob:

• Background — 4/1 am.

Darden called to notify us that work  
to rehabilitate Kayoko Site #1  
proceeding - Wells would need to be  
"blowing" open to do work. Written  
notification to come same day.  
(copy attached - see receipt dates)

✓ I informed Sus - just to be safe  
that he gets first-hand info  
before public calls do find out  
what's going on.

✓ Written notice came in 4/7 to Sus  
we need 4/8

• Talked to Darden 4/14

✓ Work on Kayoko #1 still in progress  
No venting - work involve use of

rock muffled when well flowing.

• Work involves:

- ✓ reduce wellhead pressure
- ✓ repair casing leak
- ✓ recover 4" drill pipe below 4570'.

• No complaints received from public

• Work covered by DNR approved  
extension of drilling permits,

DOWNALD

RECEIVED



09 MAR 10 A 7: **THERMAL POWER**  
COMPANY

DEPT. OF WATER &  
LAND DEVELOPMENT

28 February 1983

1229

RECEIVED

12 MAR 7 8:57

DEPT. OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII  
OFFICE OF HAWAII

Mr. Susumu Ono  
Chairman  
Board and Land & Natural Resources  
State of Hawaii  
Kalanimoku Building  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Re: Geothermal Well: Kapoho State 1  
Geothermal Resource Mining Lease R-2  
Puna District, Hawaii County

Dear Mr. Chairman:

The existing drilling permit for the above referenced well is scheduled to expire on March 18, 1983. Thermal Power Company, would like to request a third 180-day extension to the drilling permit for the Kapoho State 1 geothermal well.

This extension will allow further testing of the well to assist in better understanding the geothermal reservoir, in addition to further evaluating the wellbore and the geothermal fluids that can be produced. These activities may require a rig on site; however, we would provide in advance to you both a written notice and a program in that event.

Please do not hesitate to contact me at (415) 765-0449, should you have questions regarding this request.

Very truly yours,

W. L. D'Olier  
Vice President

WLD/tti

cc: J. M. Denton  
HA-PU-BR-A03

January 18, 1983

Ms. Rebecca L. Beemer, Manager  
Environmental/Regulatory Affairs  
Thermal Power Company  
601 California Street  
San Francisco, California 94108

Dear Ms. Beemer:

Thank you for sending a copy of your results of catchment water analyses on six Puna residences conducted after the uncontrolled flow of Kapeho State 1 in October 1982.

We appreciate your initiating this study soon after the event and for following-up in sending the information to the various agencies concerned with geothermal development in Hawaii.

Very truly yours,

ROBERT T. CHUCK  
Manager-Chief Engineer

RT:dh

RECEIVED



33 JAN 17 P 3: 47

**THERMAL POWER**

COMPANY

DIV. OF WATER &  
LAND DEVELOPMENT

10 January 1983

Mr. Manabu Tagomori  
Chief Water Resources &  
Flood Control Engineer  
Division of Water & Land Development  
Department of Land and Natural Resources  
Kalanimoku Building  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Dear Mr. Tagomori:

At Mr. Jere Denton's request, I am transmitting to you the results of catchment water analyses for mercury, lead and arsenic conducted on six Puna residences the day after the Kapoho State 1 uncontrolled geothermal effluent flow event on 2-3 October, 1982. Messrs. Fuke (Hawaii County Planning Department) and Koizumi (Department of Health) will also be receiving this information for their evaluation. We thought it would be most beneficial for all regulatory agencies to review the same data set.

The water samples were collected by Dr. D. Thomas (HIG), who is acting as a consultant to Thermal Power Company (TPC), Operator for the Puna Geothermal Venture (PGV). Six samples were collected from residences previously monitored by the HGP-A Development Group (HGP-A). These samples were analyzed by Industrial Analytical Labs, Honolulu and the results studied by both Dr. Thomas and the TPC technical staff.

Concentrations of these chemical constituents in the residences sampled and in Kapoho State 1 steam condensate<sup>1</sup> are all below the EPA drinking water standard (Table 1). Lead and arsenic values are comparable to previous levels recorded by HGP-A. Mercury concentrations are elevated relative to previous measurements but a sampling and/or analytical contamination is thought to be responsible. The lack of an observable mercury concentration gradient decreasing away from Kapoho State 1 (see Figure 1) and the fact that analysis of a laboratory blank prepared during the same collection operation exhibited a mercury concentration of 1 ppb indicate that the sampling and/or analysis were subject to contamination errors.

<sup>1</sup> These data should be treated as confidential.

Mr. Manabu Tagomori  
10 January 1983  
Page Two

It is concluded that on the basis of these data, no impact on the local drinking water occurred from the Kapoho State 1 flow event. I trust that this information will be useful in your assessment.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Rebecca L. Beemer".

Rebecca L. Beemer  
Manager  
Environmental/Regulatory Affairs

JLI/RLB/tti

Enclosures



**Table 1.** Water catchment sample results in parts per billion (ppb). The less than (<) indicates concentrations were below the detection limit of the analytical method used.

Chemical Species	Residence						EPA <sup>1</sup>	KS-1 <sup>2</sup>
	Kubera	Zubatý	Pommerenk	Zoeteway	Woods	Gilman		
Mercury <sup>3</sup>	< 1	< 1	< 1	< 1	1.5	< 1	2	< 1
Lead	< 50	< 50	< 50	< 50	< 50	< 50	50	< 30
Arsenic	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50	< 5

1. EPA drinking water standard.
2. Kapoho State 1 steam condensate.
3. Mercury levels are considered high, see text.

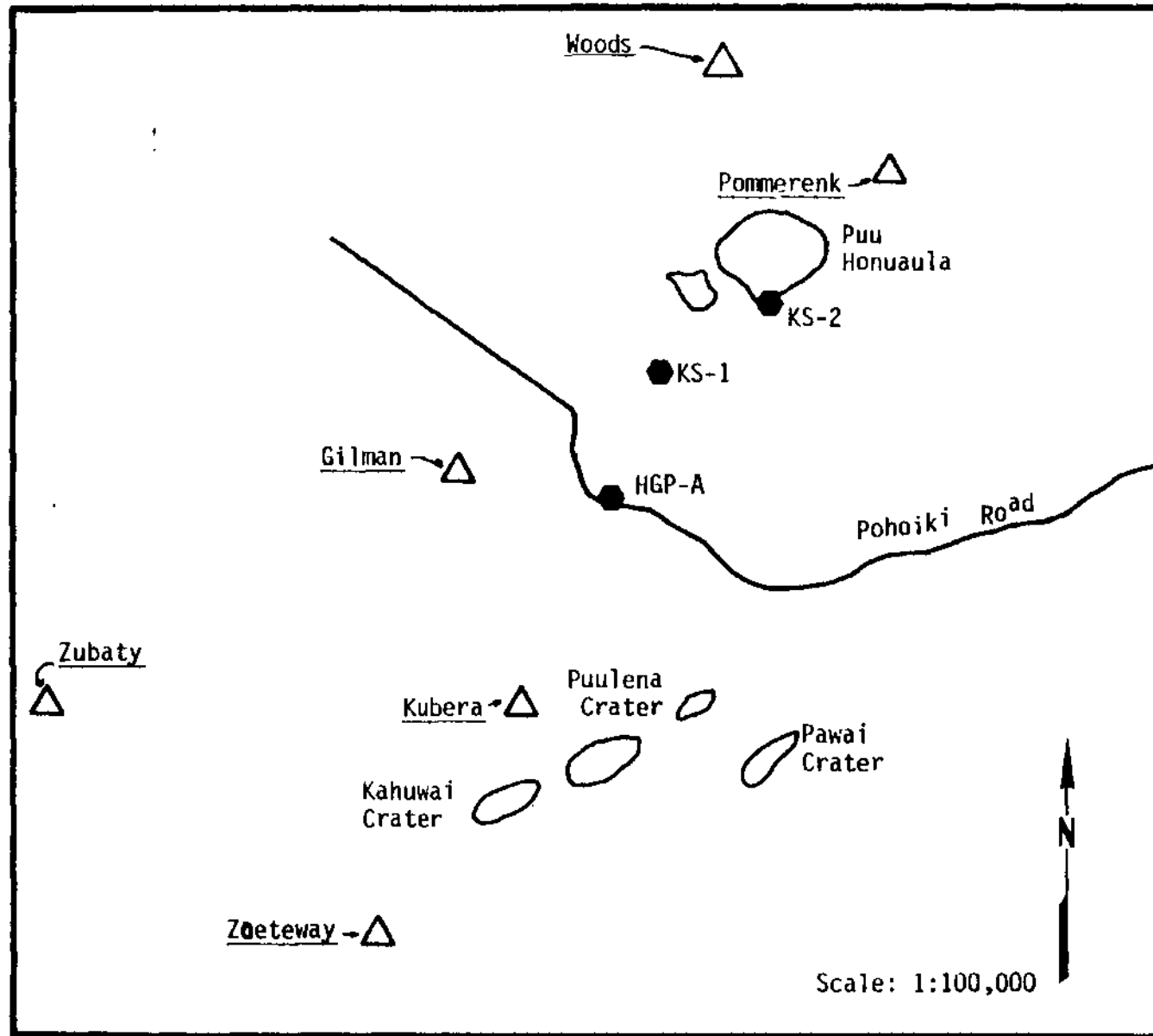


Figure 1. Location map for residence catchment system sampling.



**THERMAL POWER**  
COMPANY

14 May 1982

Jere Denton  
Vice President  
Hawaii Project

Freeman Guards, Inc.  
1333 River Street, Room 8  
Honolulu, Hawaii 96817

Gentlemen:

This letter is to request that you authorize your guard at our operation in Puna to admit Mr. Manabu Tagomori and any one else in his group to the site on Thursday, May 20th, 1982. Mr. Tagomori is Chief Water Resources & Flood Control Engineer for the State Department of Land and Natural Resources and has been invited by Mr. Jere Denton of Thermal Power Company to visit our project.

We made a verbal request for Mr. Tagomori's admittance to your Major Bill Atiz in Hilo today, and this letter is just to confirm the permission to admit someone not on our "Persons Authorized to Enter" list provided to you on 29 April, 1982.

Sincerely,

Meredith Ewald  
Secretary to Mr. Denton

/mae

cc: Mr. Manabu Tagomori  
1151 Punchbowl Street, Room 227  
Honolulu, Hawaii 96813

Major Bill Atiz  
Post Office Box 1131  
Hilo, Hawaii 96720

*Donnell*

4-27

**HILO, HAWAII, TUESDAY, APRIL 27, 1982**

*Copy*

## **Test of well was noisier than expected**

Testing at the Kapoho State Two exploratory well ended Friday, and testing of the Kapoho State One exploratory well is expected to begin next week.

Thermal Power Co. announced the testing last week, noting that a muffler system to reduce noise and equipment to abate hydrogen sulfide were to be used.

But Becky Beamer, manager of Thermal Power's environmental and

regulatory affairs, said that because of rock particles in the well bore, the muffler system could not be used during the information gathering tests.

"We had to vent directly into the atmosphere without going through the muffler system," she said.

Because of rock particles and bends in the well piping, the venting caused a "sand blasting effect," Beamer said.

Beamer has been meeting with Leilani

Estates residents living near the well to explain the tests and related problems. She admitted the tests were noisy, but added, "We tried to vent for only three hours at a time."

A Leilani Estates resident complained to the Tribune-Herald about the noise, saying "it sounds like an airport in Puna."

A local telephone number (961-2184) has been set up to answer inquiries and take complaints about the testing.

Route 6

## WATER RESOURCES &amp; FLOOD CONTROL BRANCH

From JS Date: 8/12 File in: \_\_\_\_\_

<u>To</u>	<u>Initial</u>	<u>Please</u>
_____	Manabu Tagomori	_____ See me
_____	Albert Ching	_____ Call
✓	Daniel Lum	_____ Take action by _____
_____	George Matsumoto	_____ Review & comment
_____	Nobu Kaneshiro	_____ Draft reply by _____
_____	Tom Nakama	_____ Type draft
_____	Paul Matsuo	_____ Type final
✓	Edwin Sakoda	_____ Xerox _____ copies
✓	Neal Imada	_____ Mail
_____	Joe Menor	<u>For</u> _____ Approval
_____	Mitchell Ohye	_____ Signature
_____	Kay Oshiro	✓ Information
_____	Doris Hamada	
✓	Robert Chuck	_____ Jane Sakai
_____	Takeo Fujii	_____ Elsie Yonamine
_____	James Yoshimoto	_____ Bill Koyanagi
		_____ Richard Jimnai
		_____ Yoshi Shibuya

I called Lee Ostrom, his  
 permit to expire next  
 Friday 19th.  
 He brought the attached  
 draft asking for extension.  
 looks OK & only says to DK  
 rather than Board.



**DRAFT**

***THERMAL POWER***  
COMPANY

11 March 1982

Jere Denton  
Vice President  
Hawaii Project

Mr. Susumu Ono  
Chairman  
Board of Land & Natural Resources  
State of Hawaii  
Kalanimoku Building  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Dear Mr. Ono:

In accordance with Title 13, Chapter 183-65 (7) (c), I am requesting a 180 day extension of our geothermal drilling permit for the well designated Kapoho State #1, on DLNR Geothermal Resources Mining Lease #R-2.

Before citing the reasons for the permit extension request, I would like to briefly review the work that has been done since the original permit was granted on March 19, 1981.

**Development of and Compliance with County Noise Guidelines**

A request to modify the County Special Use Permit to allow drilling seven days per week was not granted on April 1 as expected, but was delayed until May 7. Between April 1 and May 7, County noise guidelines for geothermal operations were developed and the Special Use Permit as amended on May 7 was made subject to cancellation if the noise guidelines were violated.

In order to comply with the county noise guidelines, the drilling rig had to be analyzed by noise experts to recommend mitigation measures and then negotiation had to be conducted with the rig owner to allow noise barriers, enclosures, and mufflers to be installed on the rig. After these negotiations were concluded, the noise mitigation equipment had to be manufactured and installed on the rig. This was completed in late August.

**Drilling**

Drilling began on September 1. Upon completion of drilling operations and a preliminary well test with the rig on location on November 10, the rig was moved aside and a cyclone separator/muffler was designed and constructed to allow more complete well testing. A test was run on December 16 which

Mr. Susumu Ono  
Page Two  
11 March 1982

was terminated after 40 minutes due to a) pressures which were higher than those encountered in the November 10 test and b) a noise level perceived to be too great for continued testing at that time.

## Preparation for Future Testing

Based on the brief and encouraging test of Kapoho State #1, a decision was made to drill Kapoho State #2. Discussion with a reservoir engineering consultant indicated the maximum amount of reservoir information could be obtained if tests could be performed using both wells. Therefore, further testing of Kapoho State #1 is now scheduled to occur after the completion and rig test of Kapoho State #2 near the end of March. It is believed that testing using both wells will be more efficient and minimize potential disturbances of area residents. The Kapoho State #1 cyclone separator/muffler has been redesigned since the December 16 test and actual modifications were completed last week.

## Reasons for Permit Extension Request

1. Delays encountered in commencing drilling were related to compliance with local rules which is required under item 2 of the original drilling permit.
2. Testing of Kapoho State #1 in conjunction with Kapoho State #2 will provide better data and hence better understanding of the Kapoho geothermal reservoir than would be possible by testing Kapoho State #1 before Kapoho State #2 is completed.
3. Testing of the two wells in the same time period may result in less overall disturbance to nearby residents which would be in accord with the intent of Title 13 Chapter 183-59 (c).

In view of our operations thus far under this permit and for the foregoing reasons, I respectfully request a 180 day extension of the drilling permit for Kapoho State #1.

Your early consideration of this request for permit extension will be appreciated. Please contact me if you or your staff have any questions or need additional information relating to this request.

Sincerely yours,

JMD/crn

*Handwritten:* Honolulu



**THERMAL POWER  
COMPANY**

11 March 1982

Jere Denton  
Vice President  
Hawaii Project

Mr. Susumu Ono  
Chairman  
Board of Land & Natural Resources

Attention: Mr. Bob Chuck  
Division of Water & Land Development  
State of Hawaii  
Kalanimoku Building  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

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*Handwritten:* 1379  
8212-15 F12  
STATE OF HAWAII



DONALD JAMES MURRAY  
P. O. Box 863  
Residence: 935-9189

*Murray, Smith & Associates, Ltd.*

Hilo Hotel Office Annex  
Hilo, Hawaii 96720  
Telephone: (808) 935-9725

July 10, 1981

Richard J. Miller, Landman  
Thermal Power Company  
601 California Street  
San Francisco, California 94108

RECEIVED  
JUL 13 1981

TPO

Re: "Kapoho State 1"  
Geothermal Well Site  
Kapoho, Puna, Hawaii  
Tax Map Key: 1-4-01:2

Dear Sir:

Submitted herewith please find the following:

1. Four (4) maps denoting Easements covering the "Kapoho State 1" Well Site (75,000 Square Feet or 1.7218 Acres) and "Road & Utility Easement" 30-Foot Wide (47,896 Square Feet or 1.0993 Acres).
2. Originals of legal descriptions covering "Kapoho State 1" Well Site and the Road & Utility Easement.

Please be informed that the "Kapoho State 1" Well Site has been surveyed and staked on the ground.

Also, we are presently preparing a Topographic and Contour Plan of the "Kapoho State 1" Well Site and will submit same shortly. This plan may need Stamping by a Registered Civil Engineer and approval by appropriate County Departments.

Please review enclosures and advise.

Very truly yours,

MURRAY, SMITH & ASSOCIATES, LTD.

*Donald James Murray*  
Donald James Murray

encls.

cc. Jere Denton, Vice President  
Hawaii Operations

DJM:hm

EXHIBIT "A"

ROAD AND UTILITY EASEMENT

to

"KAPOHO STATE 1"

Geothermal Well Site

Within L.P. 8177 and R.P. 4497

L.C. Aw. 8559 Apana 5 to C. Kanaina

Kapoho, Puna, Hawaii

Beginning at a point at the northwest corner of this parcel of land and on the easterly side of the Pohoiki Road, the coordinates of said point of beginning referred to Government Survey Triangulation Station "Kaliu" being 8,223.20 feet North and 8,563.44 feet East and running by azimuths measured clockwise from true South:

1. 284° 01' 146.45 feet;
2. 249° 13' 85.26 feet;
3. 243° 34' 101.26 feet;
4. 242° 05' 163.01 feet;
5. 247° 24' 440.08 feet;
6. 242° 42' 248.58 feet;
7. 237° 18' 77.82 feet;
8. 228° 12' 117.13 feet;
9. 332° 58' 20" 31.02 feet along "Kapoho State 1" Easement to a pipe;
10. 48° 12' 111.60 feet;
11. 57° 18' 81.63 feet;
12. 62° 42' 251.22 feet;
13. 67° 24' 439.92 feet;
14. 62° 05' 162.01 feet;
15. 63° 34' 103.12 feet;
16. 69° 13' 86.74 feet;
17. 57° 22' 20" 157.28 feet to a point at the easterly side of the Pohoiki Road; thence along the easterly side of Pohoiki Road along a curve to the left having a radius of 182.00 feet, the chord azimuth and distance being:
18. 172° 12' 58" 149.70 feet to the point of beginning and containing an area of 47,896 Square Feet or 1.0995 Acres.



MURRAY, SMITH & ASSOCIATES, LTD.

By Donald James Murray  
Donald James Murray

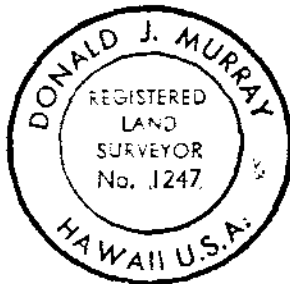
EASEMENT

"KAPOHO STATE 1"

Geothermal Well Site  
Within L.P. 8177 and R.P. 4497  
L.C. Aw. 8559 Apana 5 to C. Kanaina  
Kapoho, Puna, Hawaii

Beginning at a point at a pipe at the west corner of this parcel of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "Kaliu" being 8,982.83 feet North and 9,677.70 feet East and running by azimuths measured clockwise from true South:

- |                 |  |
|-----------------|--|
| 1. 242° 58' 20" | 250.00 feet to a pipe;   |
| 2. 332° 58' 20" | 300.00 feet to a pipe;   |
| 3. 62° 58' 20"  | 250.00 feet to a pipe;   |
| 4. 152° 58' 20" | 300.00 feet to the point of beginning<br>and containing an area of<br>75,000 Square Feet or 1.7218<br>Acres. |



MURRAY, SMITH & ASSOCIATES, LTD.

By Donald James Murray  
Donald James Murray  
Registered Surveyor

Hilo, Hawaii  
July 9, 1981

## LABORATORY ANALYSIS REPORT

 TO: Division of Water and Land Development  
 Department of Land & Natural Resources

ATTN: Mr. Daniel Lum

ADDRESS: P. O. Box 373, Honolulu, HI 96809

PHONE:

SAMPLES OF: water

SAMPLED BY: client

SAMPLING DATE: 9/11/81

TIME:

RECEIPT DATE: 10/01/81

TIME: 1355

DATE SAMPLE ANALYZED	10/02-28	10/02-28			
TIME SAMPLE ANALYZED					
SAMPLE TYPE	Grab	Grab			
SAMPLE DESCRIPTION	* #2117-01 #1122-01 Kapoho State Well 1	#2106-05 Koloa Well "D"			
UNITS					
Total Alkalinity	mg/L	127	125		
Chlorides		1150	85.0		
Calcium		53.2	4.05		
Fluoride		0.56	0.21		
Manganese		0.63	0.41		
Potassium		46.1	1.78		
Silica as SiO <sub>2</sub>		80	60		
Sodium		614	57.2		
Sulfate		169	22.7		
Iron		15.0	10.9		
Nitrate-Nitrite N		0.30	0.93		
Magnesium		30.2	23.0		
Total Hardness as CaCO <sub>3</sub>		213	96.0		
	* #1122-01				

LABORATORY REMARKS: Samples analyzed according to "Methods of Chemical Analysis of Water and Wastes", U. S. Environmental Protection Agency, March, 1979.

*Charles N. Shiro*



**THERMAL POWER**  
COMPANY

STATE OF HAWAII

28 August 1981

4-21-87  
WATER &  
EARTHQUAKE

Mr. Susumu Ono  
Chairman  
Board of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii 96809

Re: Geothermal Well Drilling Permit  
Kapoho State No. 1

Dear Mr. Ono:

We wish to advise you that Thermal Power Company, as operator for the Thermal-Dillingham-Amfac Joint Venture will commence drilling operations on Kapoho State No. 1 about August 31, 1981.

We will advise DLNR on a timely basis for DLNR observation of ground water sampling and static water level measurement. Our enclosed Procedures, updated 8/14/81, reflects that requirement and minor improvements in cement preparation.

Mr. Royce "Buddy" Bowden is our Drilling Supervisor on the Kapoho-State No. 1 drillsite.

Very truly yours,

W.L. D'Olier  
Vice President  
Geothermal Operations

WLD/LdL/ikl  
Enclosure

cc: J. M. Denton

**EXHIBIT "B"**

**DRILLING AND COMPLETION PROCEDURES  
(In Detail)**

1. Prepare road and location including an 8' x 9' x 12' cemented cellar and water storage facility.
2. Move in and rig up rotary tools. Drill and set rathole.
  - (a) Notify Board of Land and Natural Resources (BLNR) 24 hours prior to commencement of drilling.
  - (b) Read and comply with requirements as set forth in Rules 7-13 of Regulations on Leasing of Geothermal Resources and Drilling For Geothermal Resources in Hawaii.
3. Spud hole with 12½" bit and drill to 50' using mud or aerated mud as a circulating medium. Survey hole as directed. Catch 10-foot samples.
4. Open 12½" hole to 17½" hole. Change hole openers and open hole to 26". Control lost circulation with LCM; if severe, cement as required to assure competent cement job.
5. Run and cement with 100% excess 20" O.D. 94#, H-40 Buttress casing at 50' with Class "G" cement premixed with 3% calcium chloride.
  - (a) Check temperatures to ascertain proper amount of cement additives.
  - (b) Do not use float equipment on 20" - underdisplace by 20 lineal feet.
6. W.O.C. 2 hours. Land 20" conductor casing.
  - (a) Center casing with welded gusset type braces.
  - (b) Fill annulus with dry cement slurry or gravel if cement has dropped in annulus.
  - (c) Install fill and diverter line.

7. Drill 17½" hole to 800' using mud or aerated mud system as a circulating medium. Survey hole every 200' or every nearest bit change. Run multi-shot directional survey if necessary.
- (a) Using basic gel-water-caustic mud system.
  - (b) Record all lost circulation zones.
  - (c) Install mud logging service at shoe of 20" conductor casing previous to drilling out. Record continuous mud in and out temperatures, H<sub>2</sub>S, CH<sub>4</sub>, CO<sub>2</sub>, lithology, and drilling rate. Have pit level indicator and intercom to driller's station. Catch four sets of 50 gpm dry sample every 20'. Make daily copies of the mud log, keeping one (1) copy up to date and spliced in trailer. Send five copies to:  
  
THERMAL POWER COMPANY  
601 California Street  
San Francisco, California 94108  
Attention: Lou de Leon
  - (d) Run temperature log from 800' to 50' unless BLNR deems such logging to be impractical or impossible.
  - (e) At + 665' (30' below sea level) take a one gallon sample of water from the bottom of the well and determine the elevation of the water level in the wellbore.
8. Run and cement 13-3/8" 54.5#, K-55 Buttress casing at 800'. Cement as directed with Class "G" cement premixed with 1-1 perlite, 40% silica flour, 3% gel, and 1/2% CFR-2 calculating 100% excess. Include tail slurry of 200 sks Class G cement with 40% silica flour, 3% gel, 1/2% CFR-2.

Note: DO NOT permit any free water and/or mud to remain in the 20" x 13-3/8" annulus.

- (a) Run a float shoe on bottom of joint #1.
- (b) Run 1" parasite string to 500' while running casing if lost circulation is severe or other such conditions warrant its use.
- (c) Centralize joints #1, #2, the last two and every fifth joint.  
  
Space turbolizing centralizers or cement baskets as directed.
- (d) Run pre-flush consisting of 20 bbls of Flo-Check. Run 5-wiper cement plug ahead of cement slurry. Run 100% excess slurry. Maintain pump rate to attain as near turbulent flow as hole conditions will permit.
- (e) Do not overdisplace top plug. Do not exceed 1200 psi while displacing slurry. Let job dictate exact displacement of cement.

- (f) If float leaks do not pump and bleed. Close valve on cement head and wait for initial set.
  - (g) Wait 8 hours minimum before proceeding to step 9.
9. Land 13-3/8" surface casing. Weld on 12" - 400 x 13-3/8" S.O.W. casing head. Install and test B.O.E. as directed. Enter test results on tower report.
- (a) Test of casing weld not to exceed the casing collapse rating (see attached sheet).
  - (b) B.O.E. to consist of 12" Series 400 gate valve, a 12" mud cross with two side outlets for a kill line and a choke manifold, a hydraulically-operated double ram blowout preventer with one set each of pipe and blind rams, a 12" expansion-type annular preventer, and a mud fillup line. A rotating head may be added as directed. See attached diagram for B.O.E. details.
  - (c) Notify the Chairman of the Hawaii Board of Land and Natural Resources (BLNR) well enough in advance of B.O.P. test so that he or his designated representative can travel to the site and witness the test.
  - (d) Test each preventer, the stack, casing, kelly cock, master valve, check valves in kill line, and blowdown line valve to 1000 psig.
  - (e) Monitor fall back in annulus. Do not allow water to enter annulus from top. Maintain cement top at surface.
  - (f) If required, cement annulus through 1" pipe to top of existing cement with an accelerated slurry. Check with office prior to performing.
10. Drill and survey 12 1/4" hole to 4000' using mud, water, aerated water, or air as a circulating medium as hole conditions dictate.
- (a) Prior to drilling out cement, make sure kelly cock is installed between kelly and swivel.
  - (b) Survey hole as hole conditions dictate (but at least at 500' intervals using multi-shot directional survey at end of drilling). Run maximum reading thermometers with each survey.
  - (c) Continue mud logging as specified in 6(c).
  - (d) Record and test (if directed by wellsite geologist) zones of lost circulation. (See 23.)
  - (e) Run Dual Induction, Caliper, and Temperature logs, and other logs as directed by wellsite geologist.



11. Run and cement as directed 9-5/8" 40#, K-55, and N-80 casing, Buttress liner from 600' to 4000' with 40% excess of calculated Class "G" cement premixed with 1-1 perlite, 40% silica flour, 3% gel, friction reducer, and retarder, followed by tail-in slurry of same w/o perlite (heavy cement).
  - (a) Run float shoe on bottom of joint #1 and float collar between joints #1 and #2. Liner hanger to have tie back capability and adequate fluid passages. Jewelry may differ depending upon hole conditions.
  - (b) Centralize joints #1, #2, #3, every tenth joint and last three joints. Space turbolizing centralizers or cement baskets as directed.
  - (c) Allow minimum 200' liner lap and hang 5' above hole bottom.
  - (d) Circulate at least two hole volumes and reciprocate casing to cool hole and establish adequate circulation prior to pumping flush. Let hole and mud conditions dictate length of this circulation.
  - (e) Pre-Flush with 20 bbls Sepiolite flush followed by 5 barrels water. 30 bbls Flow CHECK, 5 bbls water, then cement.
  - (f) Hang liner just prior to pumping cement slurry.
  - (g) Conditions may dictate releasing from hanger prior to cementing.
  - (h) Do not overdisplace wiper plug.
  - (i) If floats leak DO NOT pump and bleed.
  - (j) WOC minimum 16 hours.
  - (k) Drill out to top of liner with 12 1/2" bit.
  - (l) Test lap with surface pressure plus fluid hydrostatic to equal a 0.8 lb./ft. gradient at liner top. Wait a minimum of 24 hours prior to testing. Enter test results on tower reports.
  - (m) Test B.O.E. prior to drilling out shoe. Enter test results on tour reports. Notify the BLNR before B.O.E. test (see 9(c) ).
12. Drill and survey 8 1/2" hole to 8000'+ using mud, water, aerated water, or air as a circulating medium as hole conditions dictate.
  - (a) Test well as determined by wellsite geologist (see 23).
  - (b) Run electric logs as determined by wellsite geologist.
  - (c) Continue mud logging as outlined in 6(c).
  - (d) Survey after each bit change or 500', as conditions permit.

13. Given the well is sufficiently productive, kill the well with water using open-end drill pipe hung inside the shoe of 9-5/8" casing.
14. Set a drillable bridge plug in the liner.
  - (a) Set EZSV 25' below shoe of 13-3/8" casing.
  - (b) Fill 9-5/8" with fluid from EZSV to surface.
15. Test plug and liner lap to 0.85#/ft. with water. Squeeze cement if required. (0.85#/ft. includes hydrostatic head.)
16. Squeeze with 13-3/8" RTTS tool set 100'+ above liner top if required and as indicated by breakdown rate.
17. Run 9-5/8" 36#, K-55 Buttress casing from top of 9-5/8" liner hanger to the surface. Before cementing casing, pick up the BOP stack and install 9-5/8" x 13-3/8" pack-off guide for the environmental expansion spool. Cement as directed with 20% excess.
  - (a) Run insert (disc type) flapper float, 40' above "stab-in" mandrel.
  - (b) Centralize casing with slim hole centralizers or lugs on every third joint and top four joints.
  - (c) Monitor fall back in annulus. Do not allow water to enter annulus from top. Maintain cement top at surface.
18. Install a 13-3/8" x 9-5/8" environmental expansion spool.
  - (a) Test of casing head weld not to exceed the casing collapse rating.
  - (b) Install 10" valve.
  - (c) Test B.O.E., as directed previously.
19. Drill out cement and bridge plug. Clean out to bottom.
  - (a) Log bridges and fill.
  - (b) Lay down drill pipe and tools following clean out.
  - (c) Check and tighten all wellhead flanges, including the 3" valves.

20. Rig down and move out rotary tools. Note: Release time (hours) on Rig Well Log and Daily Report Form.
21. In addition to B.O.P. specifications listed in the previously, the following procedures will be observed:
  - (a) Packing elements and ram rubbers will be of high temperature resistant materials.
  - (b) The hydraulic actuators for opening and closing the ram type and expansion-type blowout preventers will be located at the drillers station and at a point on ground level 50' or more from the wellbore.
  - (c) The blowdown line connecting the wellhead and the mud pits will be equipped with steel or ceramic chokes and valves. The line will be anchored at all bends and at the end.
  - (d) A blowout prevention drill will be conducted weekly for each drilling crew. During this drill, the expansion-type blowout preventer and pipe rams will be operated, using both control station actuators. All crew personnel will participate in these drills. The results of these drills will be entered in the drillers log book. Flange bolts will be inspected for tightness as a part of this drill.
  - (e) Blind rams in blowout preventers will be checked for operation on each trip.
  - (f) The expansion-type blowout preventer and pipe ram elements of ram-type blowout preventers will be checked for operation each round trip or at least once daily.
22. Have lost circulation and weighting material on location.
23. As mentioned in 11 above, the wellsite geologist shall determine when the well should be tested. The drilling supervisor shall determine if such testing is consistent with safety and well control. Should that decision be positive, the well will be tested through the drilling stack (allowing for thermal expansion of same) or through drill stem test equipment, through the choke manifold and to the sump when 3 or more of the following conditions prevails:
  - (a) MRT greater than 250°F.
  - (b) Drill cuttings reflecting the presence and abundance of alteration minerals such as zeolites, hematite, chlorides or serpentinized formation.
  - (c) Major lost circulation zones.
  - (d) Major brecciated zones.

(e) Drilling rate recorder (either on rig floor or as noted by mud loggers) indicates a significant or sudden increase in penetration rate.

(f) Well kicks gas.

Record wellhead pressure and temperature and lip pressure of 4" pipe running from choke manifold to sump every 30 seconds for the first 10 minutes of flow or until flow has stabilized. Record every minute for additional 15 minutes or until test must be terminated for safety reasons.

24. Take all measurements from top K.B.

25. Keep LCM, Lignite, and gel on location.

26. The exact testing of the well after completion will be determined by the suitability of the produced water for disposal. It is expected that produced fluids will be of a composition such that they may be flowed to the sump. Accordingly, a short 24 hour - 48 hour flow test of the well for mass flow rate, productivity index, temperature, and detailed fluid composition will be attempted. The well will be equipped with an additional 10" production valve and appropriate surface production facilities in this case.



**THERMAL POWER**  
COMPANY

31 March 1981

RECEIVED  
HONOLULU  
MAR 31 11 43 AM '81

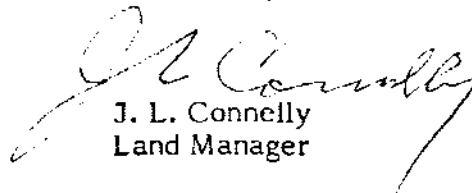
Mr. James Detor  
State of Hawaii  
Department of Land and Natural Resources  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Re: Geothermal Drilling Bond

Dear Mr. Detor:

Pursuant to Rule 9.4(a) of Regulation 8, we attach blanket drilling bond in the principal sum of \$250,000, being Bond No. 567 7792, issued by National Fire Insurance Company of Hartford, as Surety, and Thermal Power Company, as Principal.

Very truly yours,

  
J. L. Connelly  
Land Manager

JLC/ikl  
Attachment

cc: Ralph Patterson  
Jere Denton

# GROUND WATER DATA CODING SCHEDULE

U.S. Geological Survey and Hawaii Department of Land & Natural Resources Honolulu, Hawaii

12-61

## REFERENCE

102369-46 KAPOHUA STATION 10131 WAT N

ISC WELL NO. NAME OR LOCATION YR DRILLED DRILLER

1 - Niihau 3 - Oahu 5 - Lanai 7 - Kahoolawe  
2 - Kauai 4 - Molokai 6 - Maui 8 - Hawaii

10131 1944 45 15 4 3 10131 NV

QUAD MAP LATITUDE LONGITUDE OWNER OR USER

10  
CARD NO.

## PHYSICAL DATA

10131 1944 45 15 4 3 10131 NV

TYPE OF CONST. CSG. DIA. GROUND ELEV. TOTAL DEPTH BOT. OF SOLID CSG. BOT. OF PERF. CSG. MAJOR USE YEAR

rotary  
percussion  
tunnel  
dug

municipal  
irrigation  
industrial  
domestic  
unused  
sealed  
observation  
disposal  
lost  
recharge  
other

10131 1944 45 15 4 3 10131 NV

WATER LEVEL CHLORIDES RATE DRAWDOWN CHLORIDES TEMP F C

INITIAL TEST

PUMPING TEST (varies at highest sustained rate)

10131 1944 45 15 4 3 10131 NV

CHLOR. WATER LEVEL WATER TEMP. CHEM. ANAL. DRAFT

annually  
monthly  
weekly  
daily  
quarterly  
occasionally

2  
CARD NO.

FREQ. OF RECORDS AVAILABLE USED

## WATER SUPPLY

10131 1944 45 15 4 3 10131 NV

PUMP CAPACITY ANNUAL DRAFT STATIC HEAD MAX. CHLORIDES MIN. CHLORIDES AQUIFER

YEAR YEAR YEAR YEAR YEAR

3  
CARD NO.

PERIOD OF RECORDS AVAILABLE

DATE

10131 - 10131

well no.

CARD 1

CARD 2

CARD 3

688



RECEIVED

✓ DOWALD  
Ld

81 FEB 19 10 11 AM  
**THERMAL POWER**  
COMPANY

DEPT. OF WATER &  
LAND DEVELOPMENT

18 February 1981

STATE OF HAWAII

Chairman  
Board of Land and Natural Resources  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Re: Proposed Drilling  
State Geothermal Mining Lease  
Puna District, Hawaii County

Dear Mr. Chairman:

The Thermal-Dillingham joint venture submits herewith an application for Permit to Drill on the State lease approved on 19 December 1980 for issue to Kapoho Land Partnership. This single application is for the proposed well, Kapoho State 1. This well will be the first drilled of the two wells described in our Plan of Operations submitted to you on 23 January 1981. An application for the Permit to Drill the second well will be submitted at a later date.

Your early consideration and approval of the Permit to Drill for the proposed Kapoho State 1 will be appreciated. The undersigned should be the contact for any questions or further requests that your office may have on this application.

Very truly yours,  
  
W.L. D'Olier  
Vice President  
Geothermal Operations

WLD/ikl

Enclosure: Application for  
Permit to Drill

**THERMAL POWER COMPANY  
DILLINGHAM CORPORATION**

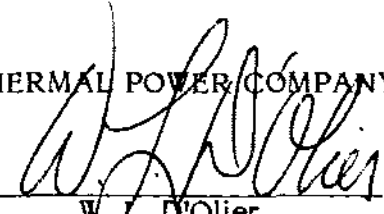
**APPLICATION FOR PERMIT TO DRILL PROPOSED GEOTHERMAL WELL  
KAPOHO STATE 1 ON RESERVED LANDS, KAPOHO, PUNA, HAWAII**

Complying with Regulation 8, Rule 9.1, Thermal Power Company as Operator for the Thermal-Dillingham Joint Venture, herewith makes application for Permit to Drill for approval by the Chairman, Hawaii Board of Land and Natural Resources.

**a. Applicant:**

Thermal Power Company  
601 California Street  
San Francisco, California 94108

THERMAL POWER COMPANY

By   
W. L. D'Olier  
Vice President  
Geothermal Operations

**Owner of Mining Rights:**

Kapoho Land Partnership

**Land Owner:**

Kapoho Land and Development Company, Limited

- b. Proposed well designation: Kapoho State 1
- c. The enclosed tax key map, Exhibit A, designates the approximate location of the drillsite for Kapoho State 1 located on a State Geothermal Mining Lease now issuing to Kapoho Land Partnership. The wellhead location will be surveyed by a registered surveyor upon completion of the geothermal well and removal of the drill rig.
- d. The purpose of this exploratory drilling is to better determine the commercial possibilities for the geothermal reservoir which exists in the Kapoho region of the Puna District, Hawaii. The drilling of Kapoho State 1 will require approximately 70 drilling days to reach the proposed depth of 8000 feet. The expected production interval may be encountered below 4000 feet. Upon completion of this well, a long flow test (maximum 3 months) will be performed. The proposed drilling and flow test will be done in close cooperation with the Hawaii Geothermal Project adjoining this acreage to better determine the economic significance of this reservoir.
- e. The Drilling and Completion Procedures, Drillsite Plan, and Vertical Section for Kapoho State 1 are contained in Exhibits B, C and D respectively.
- f. A multi-well drilling bond (\$250,000) will be filed with the State of Hawaii within 10 calendar days after notification that this application has been approved.
- g. Thermal Power Company, as operator for the Thermal-Dillingham Joint Venture, agrees to perform such exploratory drilling as outlined in this application and agrees to maintain the well in accordance with Regulation 8, State of Hawaii and all Federal and County geothermal regulations.

Attachments: \$100 filing fee  
Exhibits A, B, C, D

Submitted: 18 February 1981



# DRILLSITE PLAN

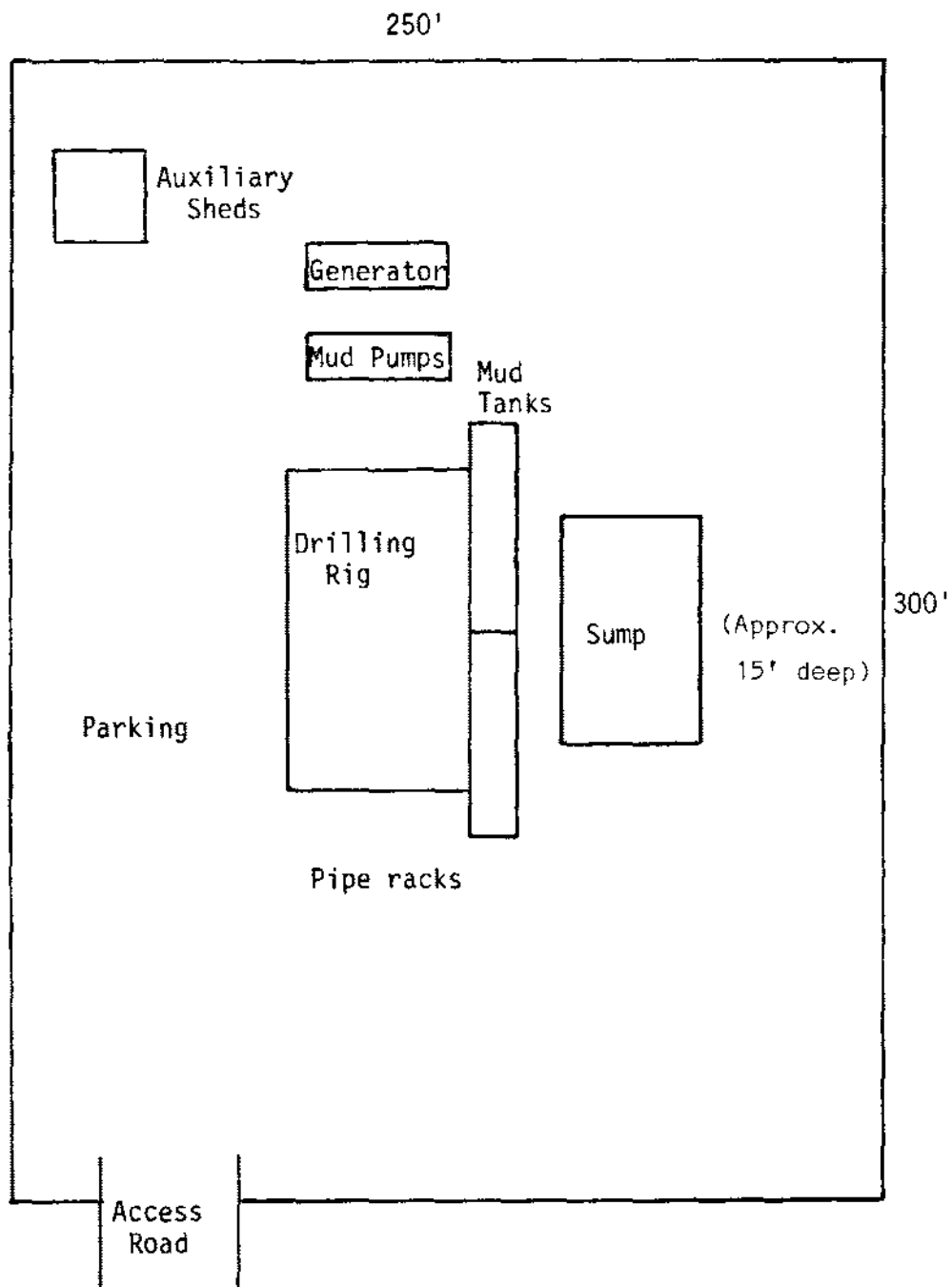


EXHIBIT C

THERMAL-DILLINGHAM  
PROPOSED GEOTHERMAL DRILLSITE  
NOT TO SCALE

# Thermal Power Company

## Kapoho State I - Geothermal Well

### Vertical Section

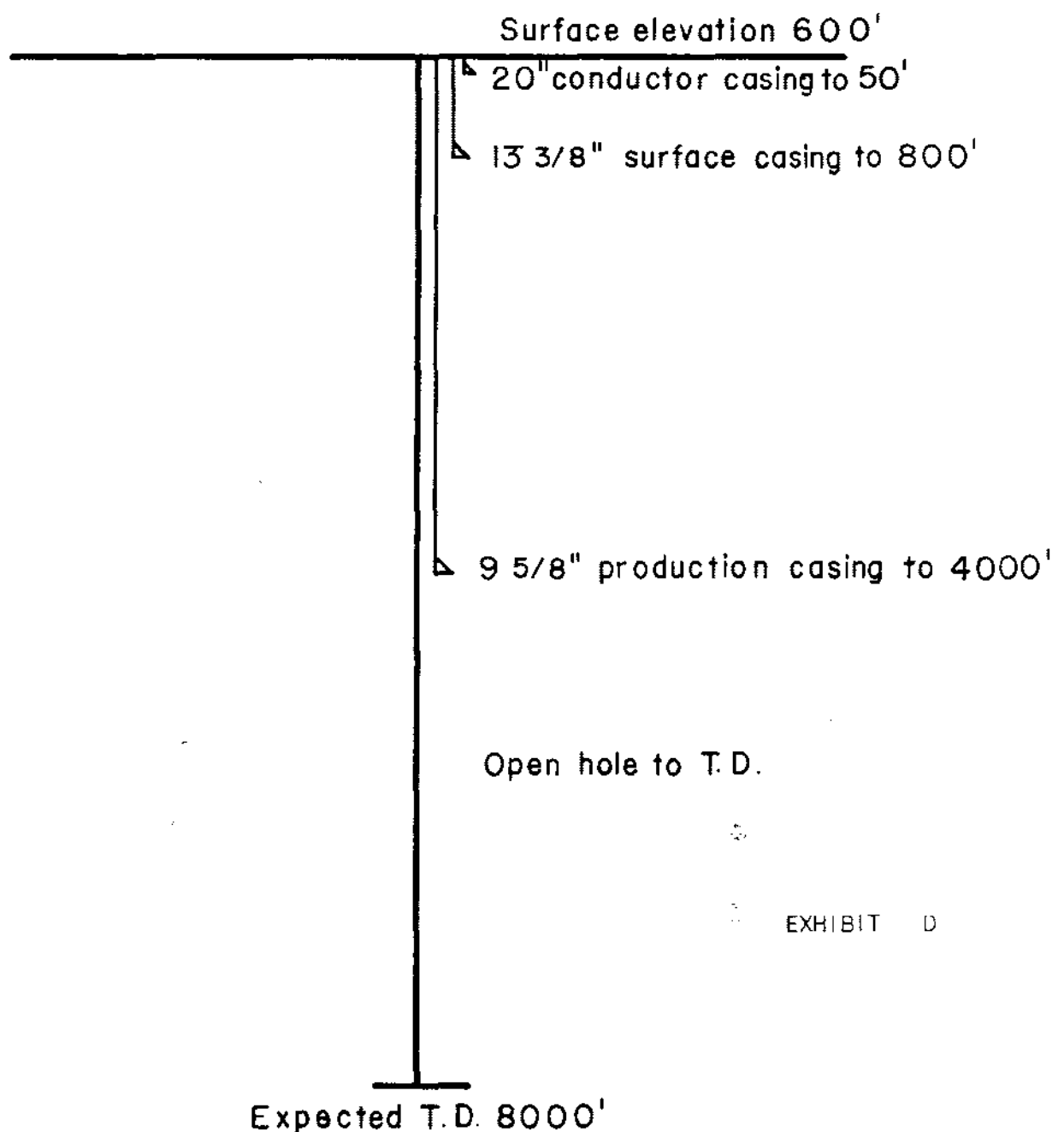


EXHIBIT D

DEPARTMENT OF TAXATION		
TAXATION MAPS BUREAU		
STATE OF HAWAII		
TAX MAP		
THIRD TAXATION DIVISION		
ZONE	SEC.	PLAT
1	4	01